

AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

Engineering
Library
UNIV. OF MICHIGAN
NOV 16 1920

Vol. XLIII
Number 20

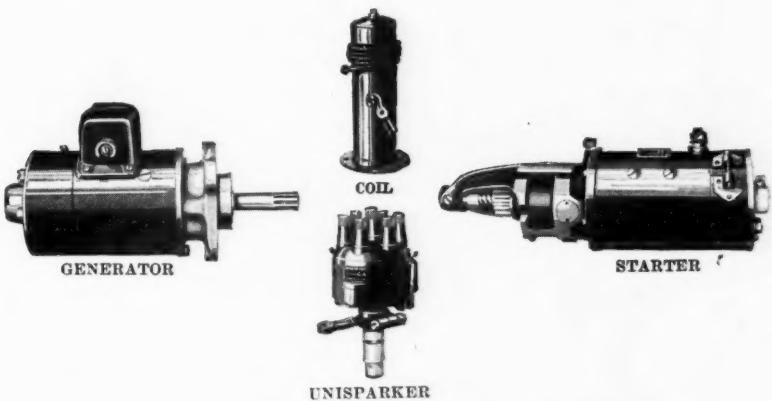
PUBLISHED WEEKLY AT 239 WEST 39th STREET
NEW YORK, NOVEMBER 11, 1920

Thirty-five cents a copy
Three dollars a year

ATWATER KENT

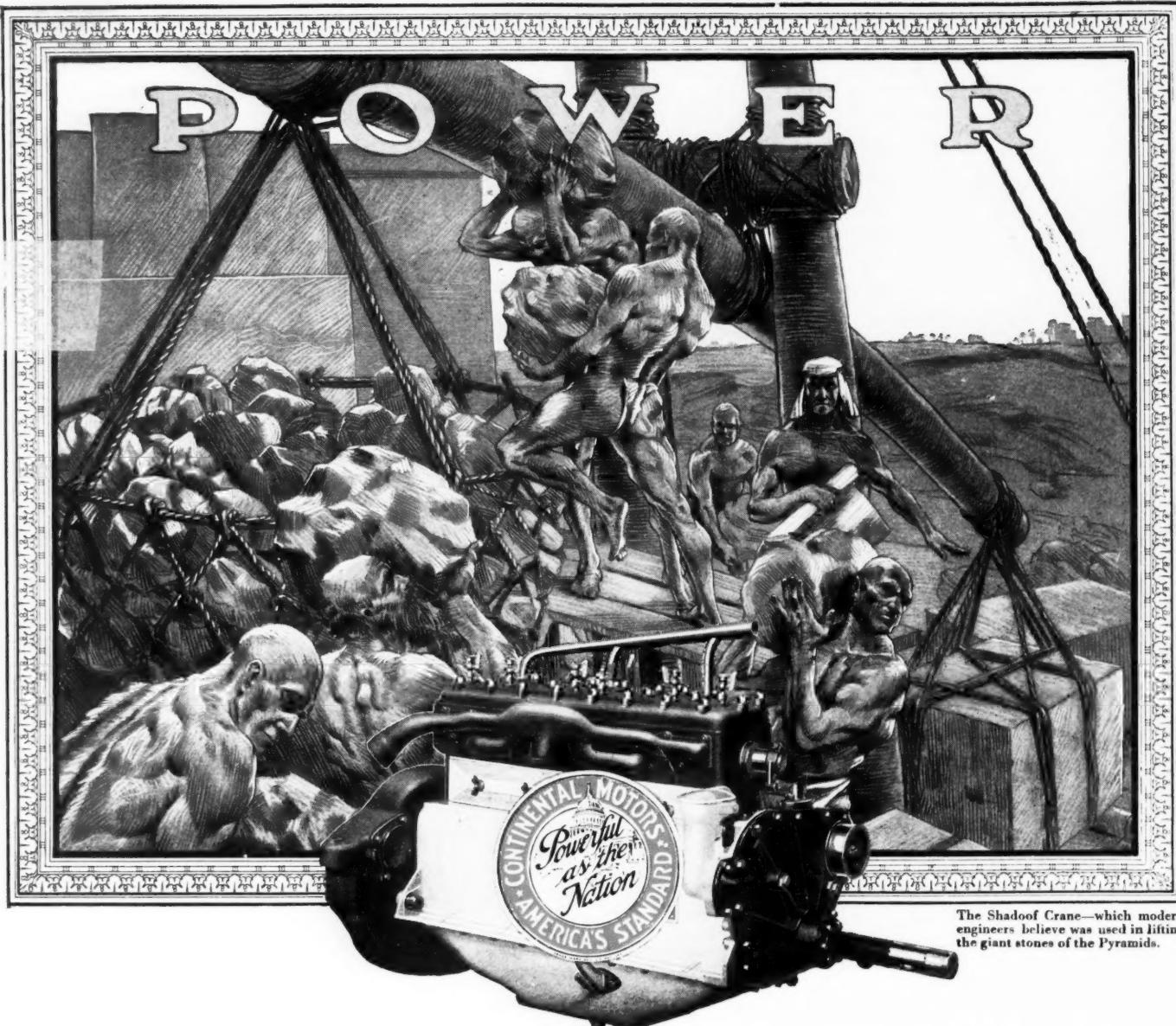
Ignition, Starting and Lighting

equipment is essentially a System De Luxe. In excellence and dependability of performance it conforms to the most exacting requirements of America's foremost automotive engineers.



ATWATER KENT MFG. COMPANY

Philadelphia



The Shadoof Crane—which modern engineers believe was used in lifting the giant stones of the Pyramids.

The vision that was responsible for the development of those basic mechanical principles has, in a sense, been inherited by the motor builder who makes use of these principles today. ¶ For where Continental Motors are produced, the vision of the directing minds of the

organization encompasses the automotive needs of the future as well as those of the moment. And it is this foresight that insures to the motor world the CONTINUED elevation of the already high standards that are represented by the Continental Red Seal.

CONTINENTAL MOTORS CORPORATION

Offices: Detroit, U. S. A.

Factories: Detroit and Muskegon

Largest Exclusive Motor Manufacturers in the World

Continental Motors

STANDARD POWER FOR TRUCKS, AUTOMOBILES AND TRACTORS

AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

VOL. XLIII

NEW YORK—THURSDAY, NOVEMBER 11, 1920

No. 20

Public at London Show Interested in Economical Car

Olympia exhibitors quickly sense changed conditions from last year, when visitors scrambled to place orders. Few important engineering changes. Thirty American manufacturers make a splendid showing.

By M. W. Bourdon*

Special Cable to AUTOMOTIVE INDUSTRIES

LONDON, Nov. 6.

THE fourteenth annual London automobile show was officially opened to the public yesterday, after a private view by the press and dealers on Thursday. The opening fell far short of last year's record attendance, but the number of cars and accessories greatly exceeds the previous highest; there is no appreciable increase in the number of Continental exhibits, despite the fact that no Paris Show will be held this year. Far more space is available this year for the exhibitors and the public, owing to the fact that the building is supplemented by the "White City," a mile and half distant. A single admission fee admits to both shows, and free motor transportation is furnished, but the public erroneously consider the White City an overflow exhibit and neglect it accordingly, although the technical interest there equals that at Olympia. Exhibitors consequently are dissatisfied.

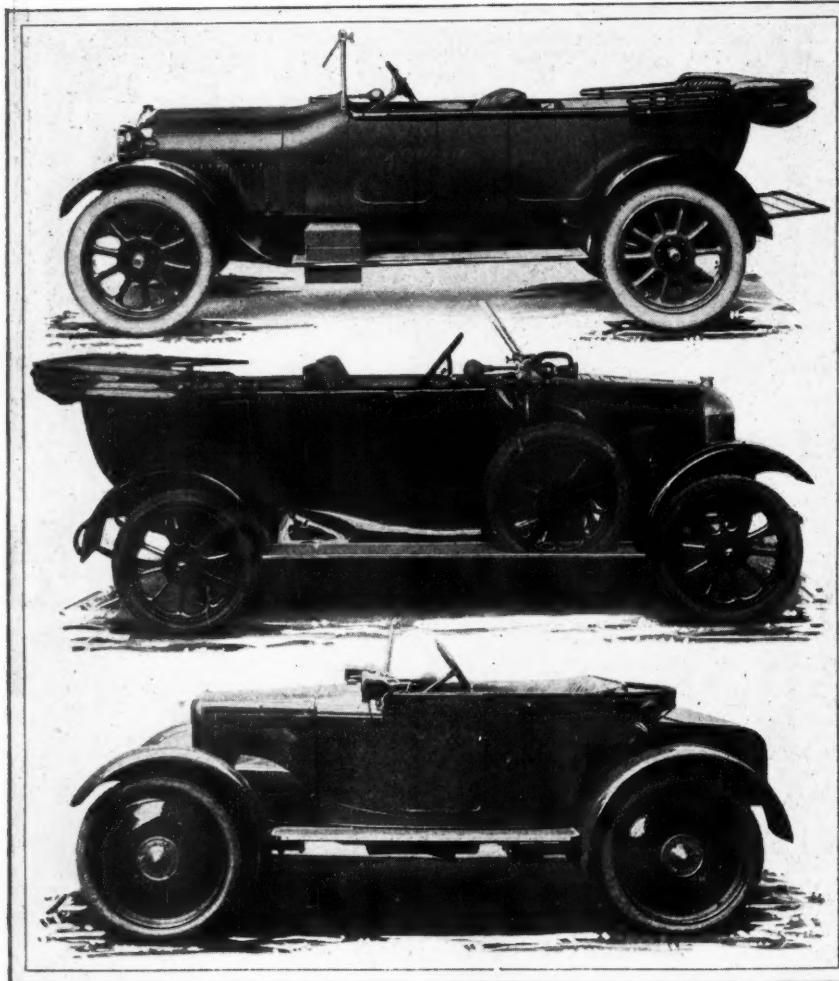
No public statement was made of the first day's aggregate attendance, but it is estimated at 15,000, which is of about the same order as the attendance at the 1913 show. Exhibitors are either anxious or

encouraged as a result of the first two days, according to the type of car staged; makers of cars up to 16 hp. selling at moderate prices report a fair business, but mostly from dealers, while private buyers still lack confidence, having anticipated widespread price reductions which have not materialized since the show opened.

There are indications of trade improvement when prices are definitely established, but nothing like last year's frantic buying is anticipated. The majority of the potential buyers are interested in small two or four-passenger cars of approximately 12 hp., endeavoring to economize in view of increased fuel prices and heavier war and income taxes. This type of car is the feature of the exhibition. Dealers in American cars report business poor, some not having sold a car in three months, but they expect an early improvement.

The Olympia staging is an improvement over any previous British show, there being wider gangways and larger stands. White City consists of several separate buildings, and the effect is poor. The senior exhibitors of all nationalities secured positions at Olympia, while the newer, smaller firms exhibit at the White City. There are 519 stands altogether, on which

*Engineering Correspondent for AUTOMOTIVE INDUSTRIES in United Kingdom.



Standard four-passenger 12-hp. Rover. Detail modifications only for 1921. Has 3 x 4 1/4 in. four-cylinder engine, three-speed gearset, worm drive and sells at \$3,750

The Morris-Oxford four-passenger light car. Has four-cylinder 2 1/2 x 4 in. engine, unit powerplant, three speeds helical bevel drive (4.75 to 1), 28 x 3 1/2 in. tires and weighs 1850 lb., with 102 in. wheelbase. Sells readily at \$2,750

8-hp. air-cooled Rover with two horizontally opposed cylinders. No fan is provided, but opening in front of hood and air scooper at the sides. Has three-speed gearset and worm drive, and has attained much popularity in England. Deliveries still three months behind with output of but 20 per week. Sold at \$1,450

are shown 679 cars of 182 different makes, including 99 British, 39 French, 30 American, 8 Italian, 4 Belgian, 1 Dutch and 1 Swiss, but no German or Austrian. The American contingent includes the Briscoe, Buick, Cadillac, Dodge, Essex, Hudson, Hupp, Packard (Twin Six only), Norma, Overland, Maxwell, Chalmers, Chevrolet, Cameron, Owen Magnetic, Dixie, Dorr, Haynes, King, Jordan, Mitchell, Moon, Nash, Oakland, Oldsmobile, Paige, Scripps-Booth, Velie, Willys and Allen. There is a larger number of bare chassis on American stands than was normally seen in former years. The Hudson and Essex companies exhibit direct.

There is no evidence of a general price reduction; the majority of the makers say such a thing is impossible, because the high cost of material and labor cause a tendency the other way where prices were not inflated during the boom. The most notable exception to the firmness of prices is in connection with the 25 hp. Vauxhall, in the chassis price of which there was a \$1450 drop just before the show, to \$7000. This had an immediate effect on sales. Business in many other cars is at a standstill, accentuating the depression. Other reduc-

tions just before the show include the following: The price of the Bean was dropped \$500, to \$2500; the Hillman was cut \$280; the Swift, \$250, and the Wolseley "15" four-passenger, \$140 (but the equipment furnished was reduced and this saving almost corresponds to the price reduction; this model is now priced at \$4400). The Ruston Hornsby "16" dropped \$200 and is now \$3000. The Darracq "16" chassis is \$1050 less and now is priced at \$2250. On the other hand, there also have been some increases; the Armstrong Siddeley price was raised \$240 and the Lanchester \$1500, this car selling now at \$10,500.

British design developments since the last show are very disappointing. With few exceptions, there has been no apparent endeavor to design for cheap production. Makers relied upon the strong demand continuing longer, and the majority have not yet given manufacturing costs serious consideration. This applies throughout the range, irrespective of size. Makers are not inclined to reduce the quality standard; therefore it would become necessary to concentrate next year on production costs, which in most cases means redesigning throughout. Phoenix has given a good lead in this direction, and the machine attracts more manufacturers' attention than new high priced cars, as it is recognized that the field for the latter is overcrowded and the anxiety of makers in this field is barely disguised. Efforts to improve vaporization are also disappointing, no new system being in evidence. Even hot spot manifolding has not yet been attempted seriously.

Battery ignition is not favored, as the makers believe (with some reason) that British buyers prefer and almost insist on the magneto. Central gearshift is merely tolerated. Some new designs are apparently adaptable to either central or right hand shift, having a sliding lever shaft in a gate above the gear box. There is a tendency to return to cables for brake actuation. A notable shortcoming of British cars is that the dynamos are belt driven, 80 per cent of the two unit systems being thus fitted.

No front wheel brakes are found on British cars, not even on the highest priced models. Clincher bead tires continue to hold the field. Metal wheels occupy a strengthened position, this applying to both disk and spoked types, Austin and Vulcan being only users of wood wheels. Aluminum is used more widely, dashboards, brackets and rear axle centers being made of the light metal. There is only one more aluminum cylinder engine, on a light, semi-racing Seabrook.

No further endeavor to reduce reciprocating weights or increase engine speeds is apparent. Air cooling is increasing for light cars, but the largest British air cooled car engine is a three cylinder 3 x 3 1/2 in. The air cooled 8 hp. Rover is in great demand. This car sells at \$1450 and the output is forty per week, being limited by the ability to obtain bodies. The largest air cooled engine is a small Cameron on a Cotay car. The English Hotchkiss company is making a small two cylinder air cooled stock engine. The only British assembled car is the Angus Sanderson. The Marlborough is assembled

from French components, and no attempt is made to compete on a price basis with American cars of the Overland type, despite the import duty. Luxury car makers show no inclination to adopt more commercial propositions. They have made no price reductions since last year. Lanchester is the only one who has increased his price, the Napier and Rolls-Royce still selling at \$10,000. Owing to the London body builders' strike, many bodies are shown unpainted and unfinished.

British designs indicate no marked extension of the use of overhead valves, though they have not been dropped by any maker who is actually in production. They are not confined to high priced models. The Phoenix is the only good example of economical design of an overhead camshaft. Buyers are generally satisfied with L heads. Unit powerplants are found as yet on only 20 per cent of British cars, but 40 per cent of the real post-war models have this feature. Side and central control are equally prevalent.

Sixes form a lower per cent, owing to the number of new makes having four cylinder engines, but no six cylinder models have been discarded. Detachable heads have not gained on a percentage basis though there is a tendency in that direction among established firms changing their design. Hollow shaft lubrication (pressure feed) shows no gain; the trough system with direct leads to the crankshaft journals is increasingly favored, while the simple trough system is losing ground. The Leyland eight is the only new car with battery ignition. Gravity fuel feed is gaining, owing to the increased number of small cars. Pressure feed is losing, while vacuum feed is stationary. Four speed gear boxes are losing slightly, approximately one-half of all the cars now having three speed transmissions. Fabric disk universals show a marked increase on all size cars. Machines with open propeller shafts (28 per cent) have them at both ends.

Spiral bevel gear final drive gained from both straight bevel and worm. The practice of fitting all brakes to the rear wheels has increased remarkably, 60 per cent of the British cars now being so fitted. However, as contrasted with the usual American practice, both sets are usually internal. Cantilever springs show a small percentage drop, while quarter elliptics are gaining in popularity on all sizes of cars, even the Leyland eight cylinder having them.

The percentage among the twos, threes and eights are as follows:

L head, 72; overhead, 20; sleeve valve, 5; inlet over exhaust, 3.

Fifty per cent of the engines with overhead valves have overhead camshafts; 60 per cent of the detachable head engines have cylinders separate from the crankcase.

Aluminum pistons are used in 26 per cent of the engines, which shows no gain over last year.

Cast iron pistons are used in 70 per cent, while the balance comes under the head of miscellaneous constructions.

Hollow shaft lubrication, 55 per cent.

Magneto ignition, 88 per cent.

Double ignition, 6 per cent.

Battery, 6 per cent.

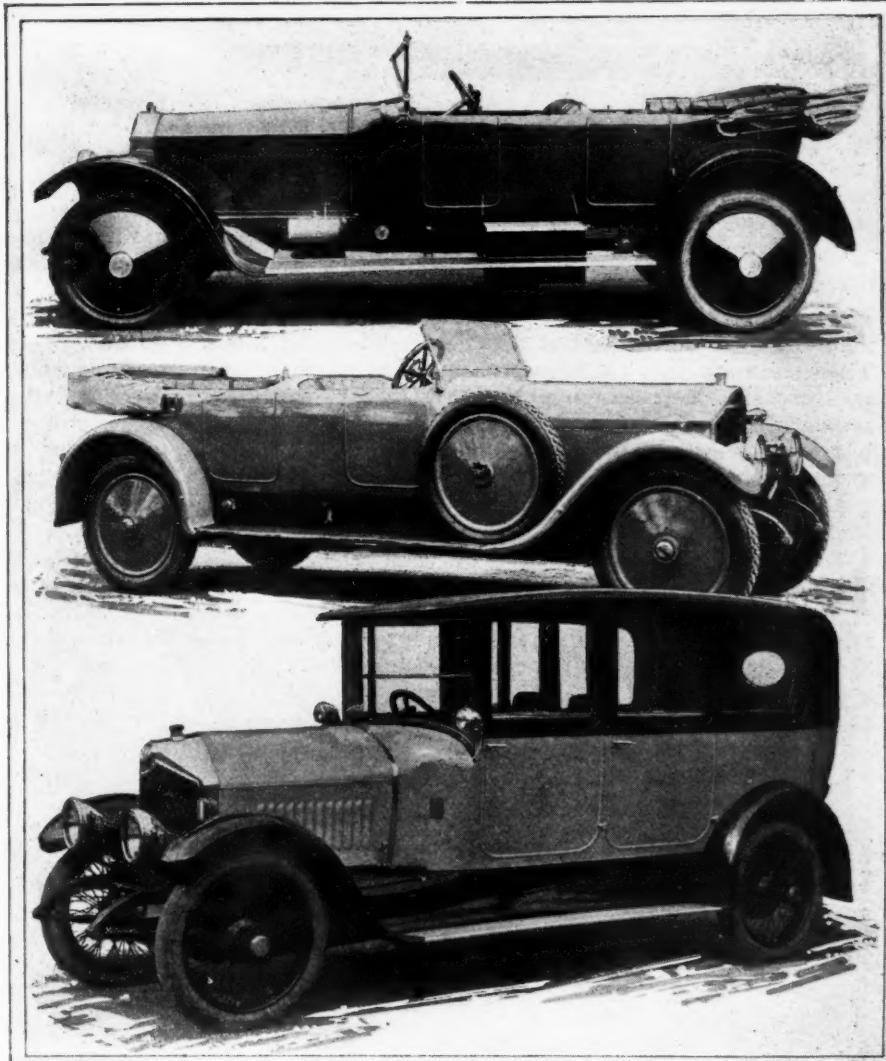
Chain distribution, 52, of which 49 per cent of the total are adjustable.

Cone clutches, 58; disk, 29 (of the latter 12 are dry multiplate, 13 mostly dry); central gearshtift, 26.

Spiral bevel final drive, 43; straight bevel, 26; worm, 20; miscellaneous, 6.

Cellular radiators, 68; thermo-siphon, 46.

Changes in Continental designs are merely a confirmation of the tendencies developed a year ago. One new firm, Darracq, has joined Delage, Hispano, Isotta and Piccard-Pictet in the use of front wheel brakes. Reports are prevalent that many other Continental firms have decided to take up front wheel brakes, some even for medium priced jobs. Overhead valves have made some progress. Gregoire has adopted Delco ignition. Unit powerplant construction has gained some ground, but no Continental maker uses the worm drive. Hotchkiss has dropped the Hotchkiss drive on a new model, on which cantilever springs are fitted. French makers are increasingly adopting cantilever springs while other Continental countries favor semi-elliptics. Metal wheels are fitted to 95 per cent of the Continental cars. These wheels show a lot of detail refinements, particularly as regards the fitments.

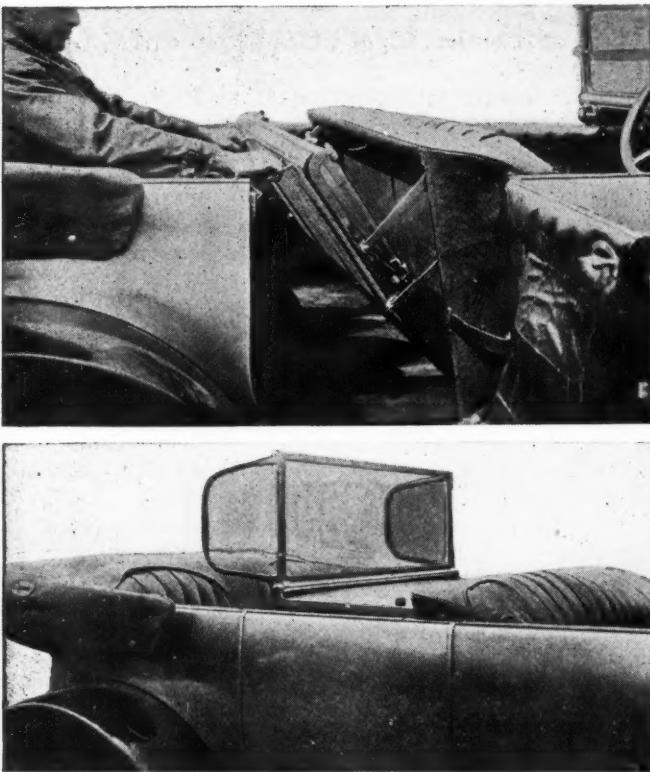


Rolls-Royce shown by the makers. Seats four including the driver.

No alterations of note have occurred in chassis since last year

40-50 hp. six-cylinder (4x5 in.) Napier with standard type five-passenger body. Disk or wire wheels are optional

Crossley seven-passenger V-front sedan



Lanchester five-passenger has folding rear windscreen which collapses to form back panel of driving seat

Lanchester rear screen extended. Forms back panel of driving seat when folded down

Italian manufacturers at the show report production now normal in their country, although a definite settlement has not been reached between capital and labor. They maintain that the importance of the disturbances was grossly exaggerated in the daily press; the great majority of the workers were opposed to violent methods but were overawed by the Red minority. The smaller automobile factories have no trouble in maintaining peace with their workers, but the very big factories find the situation more difficult.

There are few new models by well-known British manufacturers. Crossley supplements his previous four cylinder 4 x 5½-in. model with a four-cylinder 3½ x 6-in. model with detachable L head cylinders, magneto ignition, and a separate four-speed transmission. This is a high-class job and with five-passenger body is priced at \$5000.

A new supplementary Phoenix model is probably the best British production design to date. It is a four-cylinder 85 x 135 mm. (3.35 x 5.32 in.) unit power plant with overhead camshaft. Originally battery ignition was planned, but a magneto was finally adopted. The price with five-passenger touring body is \$3300. The Sheffield Simplex now has six independent 4½ x 5-in. L-head cylinders and uses the Ricardo trunk piston. The first touring car so designed has double ignition. The gearset is a unit with the torque tube at the forward end. The chassis price is \$11,000.

The makers of the Leyland truck introduced a passenger car of unusual design throughout. It has a block cast eight-cylinder-in-line engine with overhead camshaft with triple eccentric connecting rod drive. Delco ignition is used and the transmission comprises a separate gearset and a double bevel final drive. This car is priced at \$12,000. The 1921 output, consisting of only

eighteen chassis, is said to have been sold; an output of 200 is planned for 1922.

The Morris four-cylinder, 70 by 102 mm. (2¾ x 4 in.) is supplemented by a six of the same dimensions and having a unit power plant. The chassis is practically identical with that of the four, having the same wheelbase, viz., 102 in. This firm retains the magneto. Enfield dropped the five-cylinder air-cooled radial engine, which was found to be too costly, and meets the current demand with a new light four of 63 x 118 mm. cylinder dimensions (2.5 x 4.65 in.). The engine has an integral L head. This is a small four-passenger car and the price is \$2800. Standard discards the 10 hp. L head four, introducing an overhead-valve-with-push-rods type four cylinder 68 x 110 mm. engine (2 11/16 x 4 5/16 in.). It has a worm drive. A four-passenger body is fitted and the price is \$3400.

Arrol-Johnston have dropped their overhead camshaft model, which was never in production, and have resuscitated their pre-war four—an L head, 80 x 120 mm. (3.15 x 4.72 in.) unit plant construction—with modifications. Other new models are almost without exception small, light two or four-passenger cars with four cylinder L head engines of about 90 cu. in. piston displacement. Daimler, Rolls-Royce, Vauxhall, Sunbeam and Rover continue their modified 1914 models almost unchanged from last year.

The post-war overhead valve designs of Lanchester, Napier, Armstrong-Siddeley, Ensign, Straker-Squire and Wolseley show only minor variations. The Ensign is not yet in production, but the Straker-Squire and Wolseley recently commenced deliveries. Sizaire-Berwick has financial troubles and the exhibit was withdrawn at the last moment.

France is the biggest Continental exhibitor, and despite the recent labor troubles all Italian firms have their latest models on exhibition, while Switzerland, Belgium and Holland have exhibits. Nothing new has been produced by Continental manufacturers in the cheap and medium car classes. Citroen adopted right-hand drive for the British Market and dropped his prices slightly. Under American management this firm secured a strong position in the British market. Farman is in production on a high grade six and Isotta shows a high grade eight-in-line overhead valve engine.

Spa has a high class all aluminum detachable head overhead valve six cylinder chassis for the coming year. It is not on exhibition but was announced at the show. It will have front wheel brakes. The Dutch firm of Spyker exhibits a big high class six with numerous novel features. Hispano is in production on a high grade six, while Lancia decided to hold back the production of his twelve cylinder model owing to the unsettled conditions. Gregoire exhibits two new cars with detachable head, overhead valve engines.

Before the war many French makers transacted foreign business through British distributors. They now complain that, British banks having cut credits, on the order of the Government, they are seriously handicapped, as the French banks are not equipped for this class of transaction. Frenchmen express the opinion that the loss of business due to the mistake of dropping the Paris show should be retrieved by staging an exhibit next spring.

THE National Advisory Committee for Aeronautics, 2722 Navy Building, Washington, has issued a translation from the *Technische Beichte* on "Tests of a Daimler D-IV Aircraft Engine on a High Altitude Test Bench." The Committee has a limited number of copies for distribution to aircraft engineers.

Special Cable from Our London Trade Correspondent

THIS year's motor show, in some respects, has characteristics almost opposed to last year's exhibition. Its appearance is more normal and business promises to be more stable—is less on paper. Compared with last year's attendance, Friday, the formal opening, brought out fewer people than last year's inaugural, although the number present was rated as "good."

The show is about one-third larger than last year, there being upward of 500 exhibits in all categories. About half of the exhibits are at the White City group of buildings, which is inconvenient and requires a special direct automobile service between the two sections. This arrangement is an experiment, and the change from holding the entire show in one building will be criticized by visitors, and it remains to be determined if this experiment is the solution of a lack of space for a complete show in one building. The fact that there is no French show this year must be taken into consideration as a justification of this arrangement.

Last year's show resulted in a net profit of about \$200,000, but at present the profits for this exhibition are not rated at more than half that amount, as the cost is greater and the attendance is not likely to be as good. The weather is of the typical London November sort, and such depressing conditions are always reflected in exhibitions of this kind.

Next week it is probable that some account of the business done may be obtainable, but so far no price reduction trend has developed, although a few cars are marked down slightly. Because of economic conditions, prices may be expected to harden, and on this score the delicate set-

LONDON, Nov. 6.

lement of the coal miners' strike is a factor, but it is too soon to judge the effect.

Technical novelties are few and the number of new cars are fewer than last year, excepting the changes in body-work. The finish of work, especially of accessories, is greatly improved.

American cars make a better showing than ever before and more cars are on exhibition.

The automobiles exhibited are valued at \$10,000,000 and the individual machines range from a \$500 toy run-about to \$17,500 for a top grade salon car.

The owner driven light car models are the most popular and there is more talk of business around these exhibits. The light car is an elastic designation at present and considerable development may be expected.

The display of component parts, such as engines and gearsets, manufactured by specialists, is much greater and suggests that the economics of the assembled car are beginning to be appreciated by the British industry.

The private view of the show for dealers and the trade press was on Thursday. There was a fair attendance of dealers, but nothing developed to indicate the ideas of the dealers as to the trend of the trade for the immediate future. Some of the dealers are counting on a price drop and these are unwilling to enter into a contract. The manufacturers insist that they cannot drop under the conditions that now obtain in the industry. The views of the dealers probably will have their effect, however. Dealers call attention to the fact that the general state of trade reflects a different condition from last year, when large amounts of war profits were to be spent. This year trade must be done on a strict value for money basis.

Darracq Adopts Detachable Head

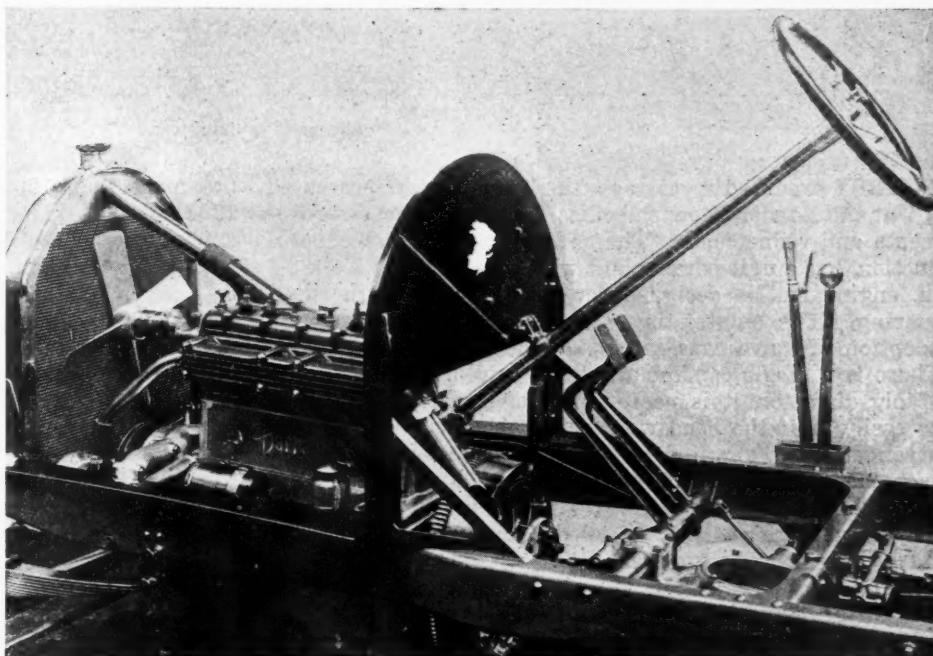
BY W. F. BRADLEY

THE French Darracq company, while intending eventually to specialize on eights, has produced a popular four cylinder model since the armistice and is continuing this for next year. The car was in production before the war, but was modified after the armistice and has a few more changes for 1921.

The engine, which has four block cylinders of 3.3 by 5.5 in. bore and stroke, now has detachable head, and the exhaust manifold, instead of being surrounded by the cooling water, is external and ribbed. The use of the detachable head is said to have added 10 per cent to the power of the engine. Another change is the use of full pressure oiling in place of pressure to the main bearings and constant level troughs to the connecting rod bearings.

The magneto has been retained on this model, although abandoned on the eight produced by the same firm. Lighting and starting is by two parts, the starting motor engaging with a ring gear cut on the open flywheel. The gearbox is a separate unit, with fabric universal

between it and the cone clutch. Final drive is by underslung worm, with an open propeller shaft having two universals. Cantilever springs are used at the rear.



Darracq 15-hp. four-cylinder now has detachable head and external exhaust manifold

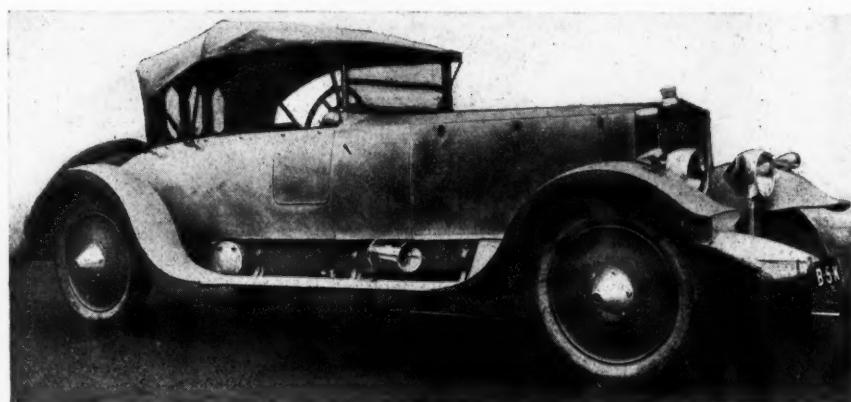
British Eight-Cylinder-in-Line Car

BY M. W. BOURDON

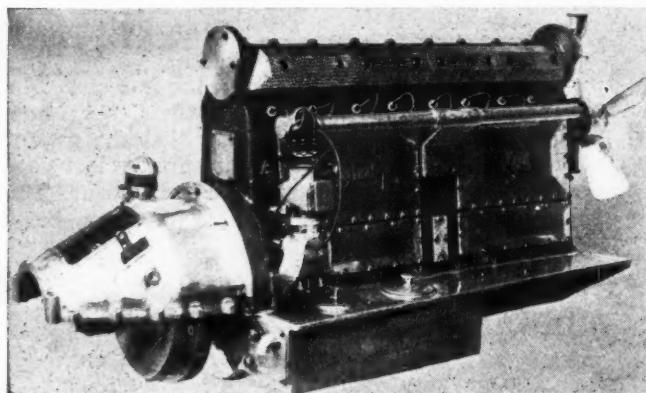
RUMOR having been busy for some months concerning an eight-cylinder car to be put forward by Leyland Motors, Ltd., Lancashire, the makers of the widely known commercial motor vehicles which have borne their name for fifteen years past, some meager details and the accompanying illustrations have been allowed to issue as a preliminary to the exhibition of the new model at the London Show in November.

As the engine view shows, the cylinders are cast as a block and in line; overhead valves and camshaft are used, with a one-piece detachable head. Ignition is by a Delco battery set; lubrication is forced throughout, the crankshaft being drilled and the connecting rods tubular; the mixture is provided by a twin Zenith carbureter.

Cylinder dimensions are $3\frac{1}{2} \times 5\frac{1}{2}$ in. and slipper type



British Leyland eight-cylinder-in-line engined car with two-seated body used during tests



British Leyland eight-cylinder-in-line engine for new car the price of which may be approximately \$15,000

aluminum pistons are used. Pump water circulation is provided, with a thermostatic temperature control.

Chassis details comprise a single disk clutch; four speed gearset separately mounted ("floating," the official bulletin terms it) with the starting motor built into the casing; twin bevel gear drive to the back axle with splayed axle shafts, the differential being located on the end of the propeller shaft. The suspension is said to be novel, embodying a "torsional anti-rolling device" applied to front and back axles.

The square appearance of radiator, hood and even the radiator filler cap is extended to the headlamps. Although the complete car shown in the photograph is a two-seater, the standard bodywork will be five-seven seated. No official announcement concerning price will be made until the show, but well-founded rumor has it that the figure will be in the neighborhood of \$15,000—so evidently one British firm, at least, holds the opinion that there is room for another super-grade luxury car on the market.

The Refined Bignan-Sport

By W. F. Bradley

FIRST produced a year ago, the Bignan-Sport presented at the London show embodies twelve months' improvements and refinements. The car, which is a French production, has a unit power plant with four cylinder 3.6×5.1 in. engine and is designed for sporting and high speed touring. The outstanding feature of the engine is the adoption of valve caps set inside the water jacket space. There is a single cap for a pair of valves, and this being of big diameter, it is possible to clean out carbon almost as easily as if the head were detachable. Because of this arrangement the water jacket head is made readily detachable. Crankshaft is carried in two plain bearings only.

Lubrication of the engine is under pressure, with an unusually large quantity of oil delivered to the bearings. Each bearing, however, is fitted with an oil collector, which returns the excess oil to the base chamber, thus preventing a smoky exhaust and reducing the amount of oil consumed. It is declared that by reason of this feature, which is patented, the oil consumption is only at the rate of one gallon for 3000 miles, at engine speeds of

not more than 1200 r.p.m.; at average engine speeds of 1200 to 1800 r.p.m. the oil consumption is at the rate of one gallon per 800 miles.

The new Bignan-Sport has been designed with a view to ease of maintenance, and the suppression of rattles which usually set up after two or three thousand miles have been covered. The cowl is a heavy aluminum casting in three parts bolted together and bolted to the frame members. It carries the support for the windscreen and can be lifted off within a quarter of an hour without interfering with the body. On the forward face of the cowl and forming part of the casting, is a horizontal dash into which is recessed, at one corner, an auxiliary oil tank, and at the opposite corner the vacuum feed tank. The oil tank, which has a capacity of practically one gallon, communicates with the base chamber, and oil can be transferred to this latter by means of a cock on the instrument board. A dial on the instrument board shows the level in the crankcase. The gasoline tank has also a shut-off cock on the feed tank. The combined breather and

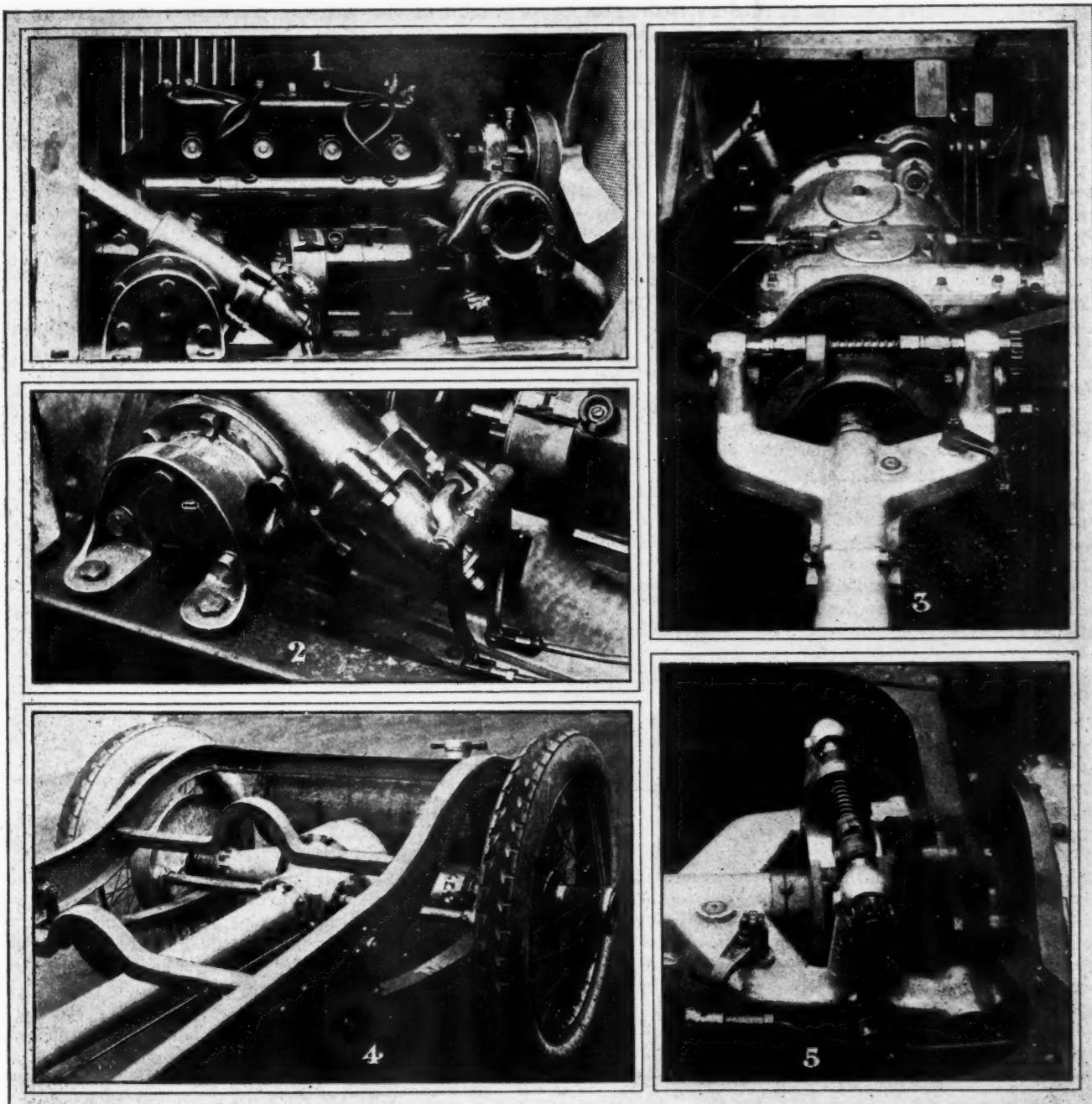


Fig. 1—Right-hand side of Bignan Sport engine, showing water pump and electric generator. Fig. 2—The steering gear on the Bignan Sport can be adjusted to any angle. Fig. 3—Bignan Sport chassis, showing the forked arms of the torque tube, external brakes and gear box. The tire pump is inside the gear box. Fig. 4—Bignan Sport rear axle. The complete absence of brake levers will be noticed. Fig. 5—Forked arms of the torque tube, showing the external brake

filler is on the valve side of the engine, the cap being held down by the head of the oil level gauge, so that the single operation of taking off the cover shows the amount of oil in the base chamber. All the gasoline and oil pipes are brought through the cowl to unions, so designed that these unions can be broken, leaving the pipes in position and allowing the cowl to be lifted off. Two electric horns, one for city and the other for road work, are mounted on the cowl, between the oil and the gasoline tanks. A polished aluminum instrument board is used and is held in position by two ebonite headed nuts. It carries the following instruments: Clock, oil pressure indicator, revolution counter, speedometer, oil level indicator, gasoline level indicator, ammeter, starting switch and electric lighting switch.

The accessibility idea has been carried through to the body, which is so designed that it can be stripped, leaving only the bare shell in position. The floor boards are all held down by a uniform type of lock, and the seat cushions rest directly on the floor. With the removable dash, this makes it possible to remove everything in a few minutes with the exception of the body shell.

The unit power plant is attached to the frame member by two hangers at the front, and by a single point to a cross frame member at the rear. The tire pump is set inside the gearbox, and the air connection brought up to the left hand frame member. A hinged aluminum cover encloses the air connection and the lever for engaging the pump. This cover cannot be closed until the lever has been placed in neutral position.

One of the distinctive features of this car is the entire absence of external brake levers. The service brakes are on the rear wheels and the emergency brake is on the transmission. Rear wheel brake drums are cast aluminum with steel liners, their dimensions being 15.7 x 2.7 in. From the brake pedal connection is made by means of a rod to a lever mounted on a vertical axis in the right hand arm of the torque member. The brake equalizer is inside the fork arms, while the main brake rod runs underneath and parallel with the propeller shaft housing, and enters the driving pinion housing, where it is connected up to the lever mounted on the shaft carrying the two brake cams. These two shafts are in tubes, which tend to stiffen the axle housing. With this arrangement every working part connected with the brakes is enclosed and working

in a bath of oil, with the result that there are no parts liable to set up rattle and the only recall springs used are those on the brake shoes. The emergency brake is on the forward end of the propeller shaft, inside the forked arms of the torque member. In this way it relieves the universal, which is a double fabric type, of all braking stresses. Unlike the rear, the emergency brake is of the external contracting type.

The rear axle is a cast aluminum structure with forged steel liners screwed in. The propeller shaft housing and torque member is also an aluminum casting with a steel liner in the tube. All spring shackles and other similar accessories are mounted with graphite impregnated bushings; these are imported from America, the Bignan-Sport car being one of the first in France to make use of them.

New Delage Four

BY W. F. BRADLEY

DELAGE'S reappearance on the four cylinder market may be taken as an indication of the difficulty of keeping a factory in Europe running on a single type of high grade and costly automobile. In deciding to make a four, in addition to the six he has specialized on since the armistice, Delage steps into the medium class. While having two models, his policy, however, avoids any appreciable increase in overhead charges, for the four is practically identical with the six except in the number of its cylinders and the length of the chassis.

Cylinder dimensions are 3.1 by 5.9 in. The head is fixed, valves are on one side, the water pump and high tension magneto are driven off a cross shaft, and electric generator and starting motor are placed respectively on left and right hand sides, fore and aft. The oiling system is high pressure throughout. The carburetor is a Zenith with vacuum feed.

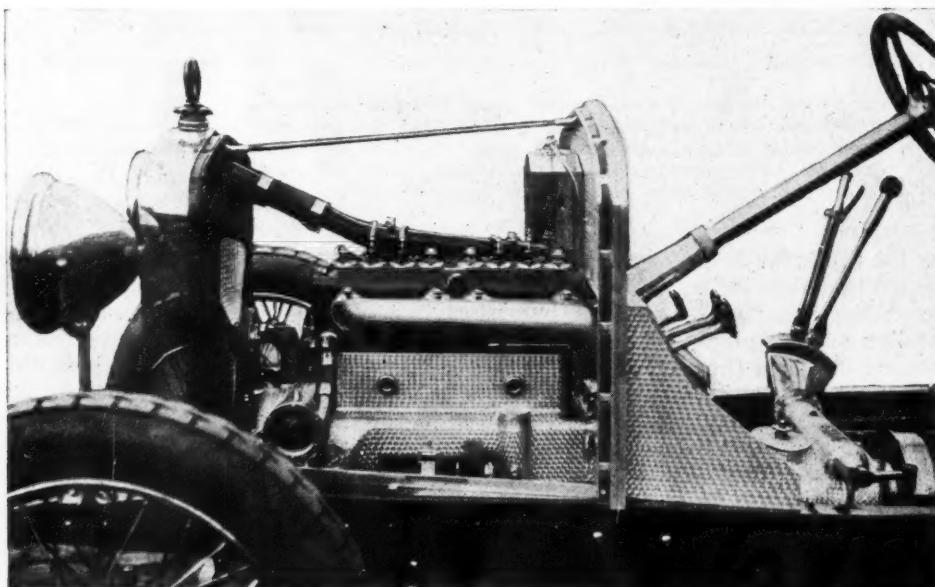
Unit construction of engine, clutch housing and gearbox is adopted, with four point attachment to the frame members. The brake and the change speed levers are mounted on a gearbox extension, quite independently of the frame members. Connection from the gearbox to the rear axle is by an exposed propeller shaft with two universals. Spiral bevel gears are used.

Delage was the first in France to specialize on front wheel brakes, for after using them on all his racing cars he applied them to his high class six brought out toward the end of the war. The four cylinder car, being intended to meet the medium class trade, is sold either with or without front wheel brakes. The front axle, however, has been designed as if front wheel brakes were to be used in every case, and the steering has been laid out as if brakes would be at the front. Normally the pedal operates internal expanding rear wheel brakes and the lever applies the emergency brake on the transmission. When brakes are added at the front the same pedal operates them all.

Motor Fuel Distillation from Straw

A GAS obtained by the destructive distillation of wheat, and other straw, is now being produced upon a small scale at the experimental farm of the Department of Agriculture. Several valuable by-products are obtained, such as carbon residue, suitable for the manufacture of lamp-black, potash, phosphates, and nitrogenous compounds. The tar and ammoniacal liquors are similar to those formed by the destructive distillation of coal. The results obtained are held to be sufficient to warrant further large scale investigation, as to the possibility of designing a plant to produce the gas in sufficient quantities to allow a farmer to supply light and heat for his house, power for his stationary engines, and possibly for his tractor, from a small individual outfit.

TESTS recently made at McCook Field to determine the power absorbed by aircraft magnetos, in which a Bosch Z H-6 and a Dixie 1200 magneto were tested on a 5 hp. cradle dynamometer, showed that the power absorbed was too small to be indicated by the apparatus. The power absorbed in driving the Liberty generator ranged from 0.07 hp. at 1800 r.p.m. when delivering a current of 1 ampere, to 0.19 hp. at 3300 r.p.m. when delivering a current of 4 amperes.



Delage four-cylinder is a copy of the same maker's six-cylinder model

A Motor Bus Body with a Steel Frame

Aircraft construction is being reflected in lighter body designs for motor buses. A framework consisting of a series of uprights and cross beams of light rolled steel joined by gusset plates is the feature of the new K type London motor bus. It was built by an aircraft steel construction company.

EXPERIENCE gained during the war in aircraft construction will evidently result in important improvements in the construction of motor vehicle bodies, tending to make them much lighter than when built in the usual way. AUTOMOTIVE INDUSTRIES recently described the Goodyear plywood body for moving vans and similar vehicles. The latest development in this field is a British design of motor bus body with a frame of light built-up pressed steel members similar in form to the structural members of metal aircraft developed during the latter part of the war.

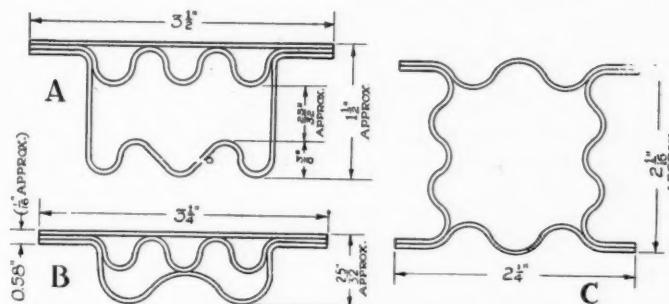
The body referred to was designed and built for the new K type London motor bus by the Aircraft Steel Construction Co. of London. The framework consists of a series of uprights and cross members of light rolled steel sections joined together by gusset plates. Details of the joints and illustrations of the three principal sections used are shown.

The uprights are in general of the form A, the lighter horizontal members of form B and the heavier horizontals of form C. These various sections are built up of steel strips rolled to appropriate shapes and riveted together. The thickness of material varies from No. 22 to No. 26 S.W.G. Connection to members having irregular outline is made by special straps fitting into the contour of the member and riveted in place. Members

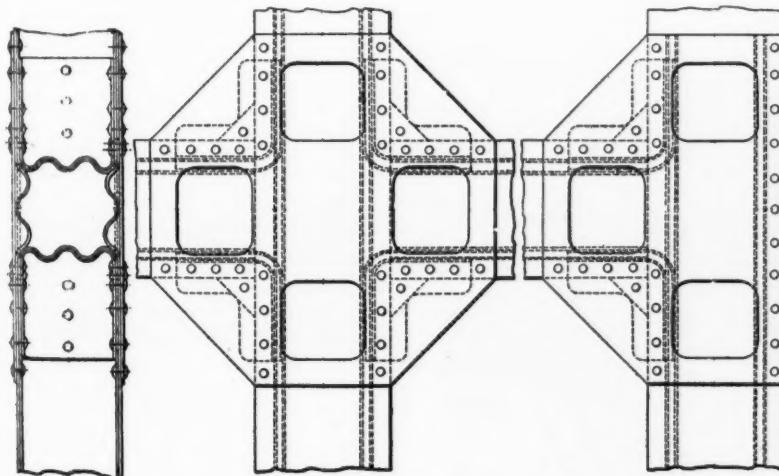
having a flat face can be joined directly by gussets, but in all cases formed straps are fitted to reinforce the members at the joint and distribute the load which comes on at the connection.

The bus has a steel roof and steel floor, and apart from the seats and smaller fittings is in its main features all-steel construction. There is, of course, nothing to prevent wood panels being fitted, and three-ply wood has been found suitable for this purpose. The steel roof as fitted to the bus with which we are dealing has, however, been entirely satisfactory. It is of 22 S.W.G. material. The floor is of 24 S.W.G. at the sides and 22 S.W.G. in the middle. It is interesting to note that the weight of the steel roof, including the supporting cross-members, is 193 lb. This compares with a corresponding figure of 244 lb. for the three-ply wood roof. The steel body all complete weighs 2140 lb. and accommodates 46 passengers.

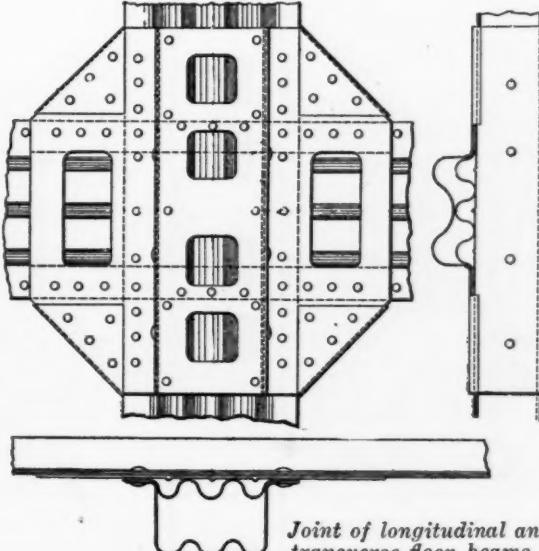
A single-decker body of this class, to carry 32 people, and arranged with 11 windows to open, weighs 1800 lb., and a special single-decker for tropical service with all-steel parts treated with electrolytic zinc weighs 1910 lb. This latter weight compares with 3375 lb. for a standard body built in teak. It will be evident that this steel construction makes a great saving in weight possible with consequent saving in fuel consumption and tire wear.



Sections A, B and C. Section A weighs 1.43 lb. per running foot, B, 0.96 lb. and C, either 1.42 or 1.24 lb., according to gage of metal



Joints of cross member with intermediate and end upright respectively



Joint of longitudinal and transverse floor beams

Radiators and Cooling Fans on the German War Trucks

Practically all the radiators of the German war trucks brought over by the Army Motor Transport Corps contained a sheet steel shell with a ribbon type of core. Various types of fans were used, all being of comparatively large diameter. Both fans and radiators inferior to those on U. S. trucks.

By Karl F. Walker

THE Motor Transport Corps of the U. S. Army brought to this country a number of German war trucks of various makes and sizes, for the purpose of inspection, tests, etc. A comparison of these with our American-made trucks is not only interesting but most gratifying. The following facts regarding the cooling of these trucks may be of interest to those who did not have the opportunity to inspect them.

Practically all the radiators contained a sheet steel shell with a ribbon type of core. A ribbon core is that type in which the water circulates between two strips of metal soldered at their outer edge. It is quite commonly used on the American passenger cars and is often spoken of as the cellular or honeycomb type of core.

The unit construction was used almost universally. In the unit type of construction the radiator core is soldered in the shell, that is, the shell and core form a solid unit. This is the old type of radiator construction, which has proved unsatisfactory, due to the fact that any weave in the frame of the vehicle is liable to throw a twist or strain on the radiator core, thus causing leakage. It must be remembered that the metal in a ribbon core is only a few thousandths of an inch thick, and as a result is not very strong mechanically.

One or two of the radiators comprised a cast shell, which, of course, added greatly to their strength. There were only a few cast-iron, built-up jobs such as are being commonly used on the large sizes of American trucks.

Most of the cores were of the direct cooling type, where flowing water is on one side of the core metal and air on

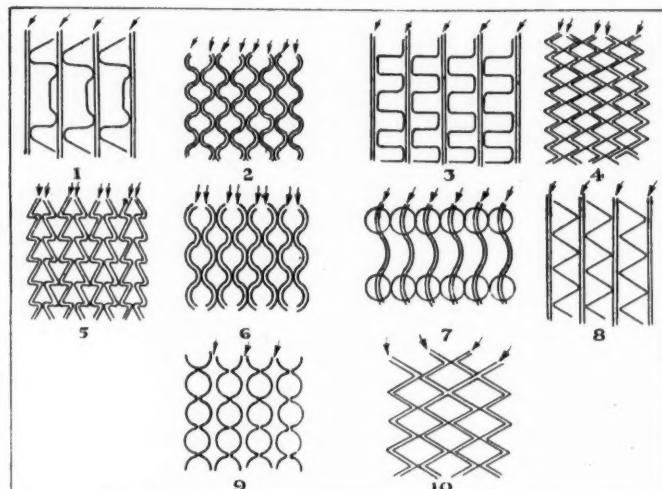


Fig. 1—Types of German war truck radiator cores

the other. Those using dead lines or indirect cooling surface used a comparatively small amount of such surface, and in all but one case these inner ribbons contained no perforations. The sketches (Fig. 1) show most of the types of cores used. These were used on the following trucks: Type 1, Bussing; Type 2, Heine-Ehrhart, Pokorny, Podena, Stoewer, Vosnag, Hansa-Lloyd, Mulag, Nacke, Bergmann and Opel; Type 3, Daimler, Saurer (small); Type 4, Dixi-Eisenach; Type 5, Hercules; Type 6, Karl Schmidt; Type 7, Durkopp; Type 8, Benz; Type 9, Graef and Stift; Type 10, Union, Daag.

The Presto used a fin and tube core of the continuous horizontal fin type. The fins were about $\frac{1}{8}$ in. apart and the tubes were arranged in straight rows on approximately $\frac{5}{8}$ in. centers. On a large Benz truck, also using the horizontal fin and tube type, the fins were so arranged at the front and rear faces of the core that they gave the appearance of a hexagon honeycomb core. The tubes in this core were arranged staggered and the core was built up of six sections. A section could be removed for repairs or replacement by removing one bolt at each end of the section.

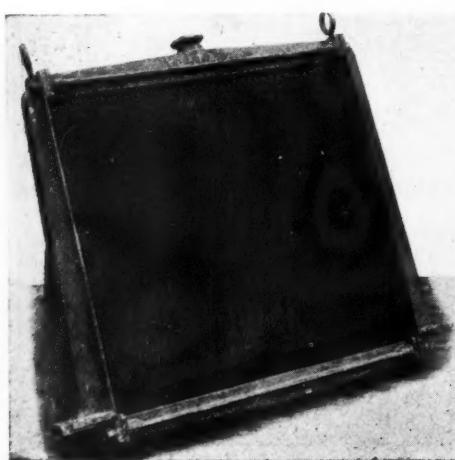


Fig. 2—Three-ton German war truck radiator

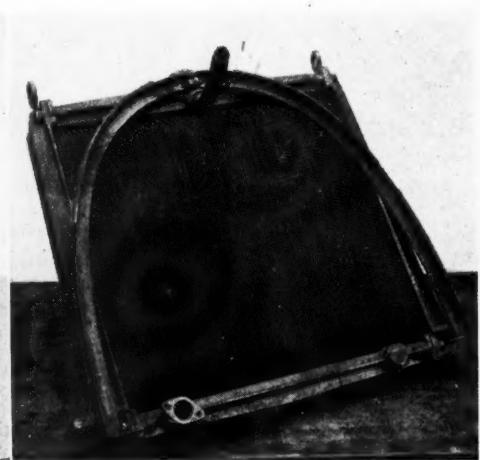


Fig. 3—Three-ton radiator

Another interesting type of core and radiator construction is shown in Figs. 2, 3 and 4. This radiator is built up in sections similar to the ordinary steam or hot water radiator used in homes. This unusual type of core and construction is only of passing interest, as it does not contain commercial possibilities of competing with the modern radiator.

The depth of the cores used on these German trucks ranged from about 4 to 6 in., the average being a trifle under 5 in. This is deeper than the average ribbon cores used on American trucks. It was also noted that the exposed frontal area of these cores was somewhat larger than commonly used on American trucks of the same size. As these cores were mostly direct cooling they would in general make better airplane cores than truck cores. They would be more efficient at high air speeds than the average American ribbon type of truck core, as there is nothing in the air passage to hinder free air flow. Therefore in airplane work their heat dissipation would be high and their head resistance low. This is probably one reason why such large radiators were needed on the trucks. The German trucks were governed down to a comparatively low speed, probably on account of the lack of rubber tire equipment, thus necessitating slow moving vehicles. Another reason was because the cooling fans, which are very essential in the proper cooling of a slow moving vehicle, were far inferior to the American designed fans.

The German cooling fans varied a great deal in their design. Some of the various types used were as follows: A narrow curved three-blade steel, a four-blade ribbed pressed steel, a narrow four-blade pressed steel, a wide curved four-blade cast aluminum, a narrow curved four-blade pressed steel with a wide rim around the periph-



Fig. 4—Three-ton radiator details. Section of core, header, side member, hold-down bolts and block

ery, and a six-blade cast aluminum fan—six types in all.

One good feature in their design was that these fans were of somewhat larger diameter than those commonly used on American trucks, ranging in diameter from 19 to 24 in., approximately. The fan belts on all the trucks were under 2 in. in width. There were only a couple of models on which fan shrouds were used, and they were of such poor design that it is believed they were more of a hindrance than a benefit to the cooling system.

The radiators, with the possible exception of one or two, used steel tubing for the overflow. This practice, of course, was probably a case of necessity. It was further noted that the accepted practice for supporting their radiators was by using cast brackets riveted to the side of the shell.

Taking all things into consideration, the radiator construction, the type of core and the design of the fan and fan shroud used on the German war trucks were inferior to the radiator construction, cores, cooling fans and fan shrouds used on Uncle Sam's war trucks.

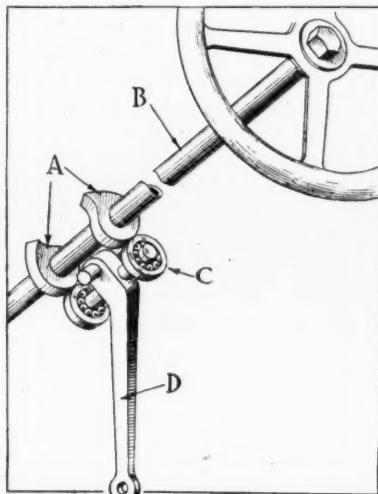
Marles Steering Gear

A SIMPLE form of steering gear for automobiles and motor trucks, which is said never to develop any backlash, and to operate with a very small amount of effort, has been developed in England by Henry Marles. Mr. Marles began his experimental work in the steering gear line shortly before the beginning of the war, having been previously engaged in the manufacture of ball bearings under the firm name of Ransome & Marles.

Referring to the diagrammatic illustration of the gear, at the lower end of the steering shaft there are two volute, hardened steel cams, which are formed in one piece and are spaced some distance apart. A pair of steel

rollers upon a shaft secured to the steering lever serves as cam followers. One of the two cams is the counterpart of the other; that is, as one cam tends to force its follower farther away from the axis of the steering shaft, the other cam allows its follower to approach nearer to the shaft. An important feature of these cams is that the rise or lift is not constant throughout. That part of the cam face which operates the gear at the straight ahead position is considerably slower in rise, so as to afford greater control of steering for high speeds, when the car is always traveling straight ahead. Less than a full turn of the hand wheel is required to move the steering wheels from full over one way to full over the other way.

The short shaft carrying the two roller followers normally lies parallel to the steering column. As the steering wheel is turned so that the upper cam tends to force the roller co-acting with it outward, or away from the steering column, the lower cam permits the roller on the lower end of the roller shaft to move inward, or toward the steering column. The rollers move with a purely rolling motion on the cam externally. Internally they move on rollers, which in their turn roll upon the rocker shaft, which in turn turns upon ball bearings. As all sliding friction is eliminated, it is claimed that no backlash will ever develop in the gear.



Marles Steering Gear

ACCORDING to a British contemporary, on 61 motor vehicles examined in France during the war there were sixty-five different sections of steel employed for the springs. This total lay within a range of from 1½ in. to 4 in. wide. A little standardization might profitably be considered here.

Now Is the Time for Standardization in Truck Body Measurements

This movement, which will mean so much to the sale of trucks does not involve any basic engineering problems and will not hamper originality in design. In addition to making possible a lower price, it will mean a more competent and stable body building industry.

By J. Edward Schipper

NOW that an era of price cutting has set in, in the truck industry, it should bring home to the truck manufacturer the necessity for carefully going into means of reducing the cost of manufacture. While it is true that production costs on trucks run higher per pound than on passenger cars, because of the much smaller quantities produced and a consequent increase in overhead, this is by no means the only reason why truck prices are relatively high. Probably one of the greatest factors in keeping the price as high as it is to-day, particularly in the larger capacity trucks, is the unstandardized condition of the factors which influence body mounting.

For as long a period as 10 years there have been sporadic agitations among truck manufacturers in reference to the standardization of trucks. This has been particularly true insofar as the matter affects the body builder. There is not a body maker in the business who has not received inquiries from truck manufacturers for units such as the dash, seat or cab to be made entirely of steel. In making the inquiry the truck manufacturer may specify any number from a half dozen to a thousand of these units, and generally when the price quotations are received, including as they do the necessary die equipment to make the special designs for the manufacturers, the price has always seemed high.

There has never been any real effort for manufacturers to get together on standardization of such a point as, for example, the design of dashes.

As matters now stand, it is not possible to supply, for instance, a standard seat to fit all trucks, and efforts to get the manufacturers to agree on a standard type of cab or seat have never gotten very far. At present, however, there is a real reason for getting together, inasmuch as the condition of the market clearly shows that price cutting is going to mean profit cutting to a very great degree, unless manufacturers can produce the goods for less money, and there is no quicker or more certain way of doing this than by sane, common sense standardization.

If a man buys a truck, the range of standard bodies which he should be able to get for a minimum cost and with the quickest possible delivery, should be sufficiently great for him to accommodate the needs of his business rapidly, unless he is in some very exceptional line.

There are many examples of big sheet metal workers who have been kept out of the truck body business simply for this reason. The quantities are not large enough and it would not be worth their while to go into it under present conditions. These concerns, during the war, turned out tremendous numbers of truck bodies for the

Government and did it efficiently and at a low price. Were it possible to standardize to anything like the degree made possible by the war for army work, truck manufacturers could take advantage of the lower body prices.

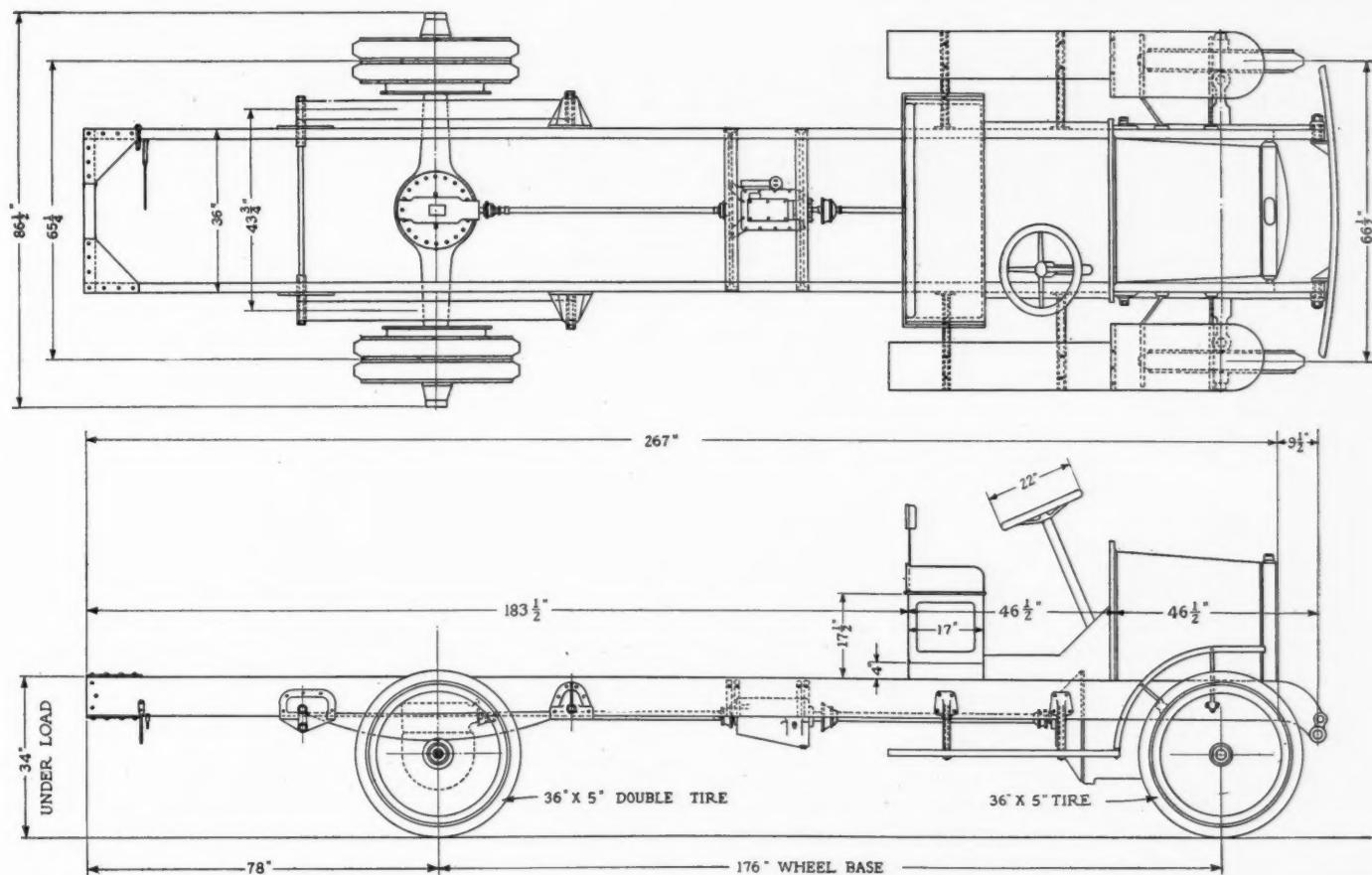
These sheet metal workers do not hesitate to state that were it possible, by means of standardization, to bring the body manufacturing business down to a production basis, they would not hesitate to go into it, and this could not fail to reduce the cost of the bodies.

A few of the points which would have to be considered would be the width of the chassis frame, location of control levers, location of the gasoline tank, location of tool box, location of steering wheel, length for driver's seat or cab from dashboard to back of seat measured from out to out. The hood ledge over which the hood fits on the dash could, of course, be varied for the different shapes of hoods, but the rest of the parts could be fairly well standardized.

Now that truck rating is up for discussion and it is very probable that in the near future we will have a greatly reduced number of ratings for trucks, with the elimination of the intermediate sizes, the opportunity is ripe to go a step ahead on the matter of standardization of the dimensions which affect body manufacture. There is rarely a problem in standardization which does not benefit the majority and penalize to some extent the minority, but where the penalization in this case would come in it is difficult to see. Surely, the truck manufacturer would profit, because his truck would reach the dealer at a lower price. The body manufacturer would profit, because he could make a manufacturing schedule which would put his plant on a real production basis, instead of on the spasmodic basis which exists at the present time, and he would also be able to manufacture his bodies more cheaply because he would be justified in going to the expense of tooling up, to some extent, for quantity production.

Under present conditions it is impossible for a body builder to start work until he knows upon what chassis his bodies are to be mounted.

Any manufacturer who builds bodies of full panel or any other style that start from the dash line, is unable to standardize on the construction until the control layout is standardized; this simply means that the whole job will have to be done approximately at one time, since all units are affected. It is a big task, but it does not present an insurmountable problem, and there should really be no need of pointing out to the people in the industry the advantage of having standardized dashes, cabs and dimensions affecting the mounting of the bodies.



A typical body dimension chassis drawing

The benefits arising from the standardization of the width of chassis frame are far reaching. This is, of course, the fundamental dimension which determines the mounting of not only the body but practically every unit in the chassis, and were the frame widths fixed for trucks of given capacities the mounting attachments for the products of the parts makers would, of course, be simplified to a single dimension for each capacity also. At the present time body makers resort to various means to meet the variations in frame widths, a number having slotted bolt holes to accommodate a range of widths.

All of this, however, interferes with the rigidity of the body fastening and also increases the cost of manufacture.

There are no basic engineering problems in the determination of a frame width, so that originality in this respect would not be stifled to any material degree. Once a logical frame width is settled, there does not seem to be any reason for objections to it, as even now the variations are not great. For in-

stance, on one truck we will find a frame 36 in. wide from outside to outside and on another, 38. If both frames were 37 in. wide neither manufacturer would be adversely affected.

As regards the location of the control units, such as the steering wheel, shifter and brake levers, inquiry directed to manufacturers of trucks has indicated very little objection to establishing a standard on these points. In fact, if all of the matters to be standardized are taken up and discussed one by one, none of them presents any big problem other than that of getting manufacturers to agree to a good, useful practice. With the industry in the present slack condition, this is an ideal time to carry out this work. Production is not being rushed at any point, and while it is, of course, not to be hoped that a standard adopted now would be universal in a year, there is good reason to believe that co-operation could make it practically universal within two years. The matter should be taken up as soon as possible.

New Piston and Ring Construction

HARRY B. JOHNSTON of Seattle, Wash., has invented a new piston and ring construction for which he claims a much better sealing effect than is obtained with ordinary piston rings. Only two rings are used per cylinder, both above the piston pin, the upper one being depended on chiefly to seal the cylinder during the power stroke, and the lower one, during the suction stroke. The upper ring has an inclined lower wall and is located in a groove of corresponding section. A portion of the upper land of the piston is cut away, to place the ring groove in communication with the com-

bustion chamber. The result is that any gas pressure in the cylinder forces the ring downward against the inclined surface of the groove and also outward against the cylinder wall. The rings are made with only a minimum of initial pressure, to just keep them against the cylinder wall. Thus the ring pressure varies directly with the gas pressure which it is desired to seal. An inclination of 35 deg. was found best for the inclined surface of the ring. Tests are said to have shown a material increase in power when Johnston pistons and rings were substituted for stock parts.

Economy of Horizontal Space by the Machine Layout

In this description of a section of the Holley carbureter factory, there is a marked lesson in the advantage of arranging light work on a continuous table, with machines spaced by the requirements of the workmen. With operations properly spaced, entire group becomes a practical machine.

By J. Edward Schipper

IN the manufacture of small parts, some problems are presented which are in every way as complex as in the larger units. In fact, on account of the greater number of units handled in a given length of time, the necessity of continuity and speed is augmented considerably. In the Holley carbureter factory the problem has been solved in a manner which should be generally applicable to the manufacture of small parts, weighing up to as much as 75 pounds.

Fundamentally, the principle is the utilization of the vertical space in the factory and the conservation of the more costly horizontal space. By the use of vertical machinery of the drill press type, it has been possible to concentrate manufacture to such a degree that a tremendous number of units can be manufactured in a very limited amount of floor space.

The layout, which is shown in Fig. 1, is a typical unit. In this row of drill presses arranged on a continuous table, it is possible to turn out 150 Holley mixing chambers per hour, or 1500 in a ten-hour day. This unit is 50 ft. in length and takes care of 36 operations, which are handled by 21 men who work side by side, standing on the wooden platform shown directly in front of the table.

A feature of this unit type of drill press installation is that only in a few instances along the line has it been necessary to make any changes in the stock heads. All of these heads have been supplied by the Avey company and they are mounted in such a way that they can be moved to any position along the line of the table. The driveshaft, as shown in Fig. 2, which is a view behind this line, is keyed so that the drive pulleys can be moved along to suit the position of the heads. The shaft is driven by electric motors placed at points along the line and this installation is such that it can be varied to suit the power demand and the convenience of the shop.

By grouping the manufacture into units of this kind, it is possible to operate them under the gang system, although the gang is a little larger than it is customary to handle in one group. If several of these units are working on one type of product, such as at the Holley plant, it is possible to operate them in competition and to arrange the compensation on a bonus system, based on proper time study. The drill heads have the advantage of being the most economical type of unit in the shop from a space standpoint.

As the heads are high and narrow, the horizontal space required along the table is not governed so much by the machines as by the requirements of elbow room for the operators who stand in line along the platform.

With this layout it makes it easy for one man to perform two or more operations on a machine, when desired. In the unit group shown in Fig. 1 with the 36 drill heads operated by 21 men, it allows approximately 2½ ft. per man along the line, which gives about as compact a layout as is practical from the man standpoint. By proper arrangement of drill heads along the line, and where necessary using two for similar operations, if that be required, it is possible with this sort of layout to get a very well-balanced production, so that there is no piling up of the material along the table. The work can be pushed from one man to the next as rapidly as each individual operation is completed, so that when the entire group is functioning properly, it gives the effect of one large machine, the movement along the line being smooth, rapid and continuous.

To give an outline of the work in this layout, it will be of interest to sketch the successive operations and the equipment required for each. As will be noted in Fig. 1, the castings for the mixing chamber come in rough at one end and leave finished at the other. The carbureter manufacture is practically completed by the making of this unit, as the remaining parts are largely products of automatic machinery. The operations are as follows:

1—Milling carbureter manifold flange. The piece is held in a rotary milling fixture of a milling machine made by the Cincinnati Pulley & Machine Co. This is a continuously rotating fixture. It holds twelve pieces. The head is the Avey No. 3 planetary type with a special attachment for the rotating table. It is provided with an end milling cutter.

2—Boring the intake end for the hot-air tube. This is done on a double jaw boring fixture operated by left and right-hand screws. The work is located from the milled flange face and the outside diameter of the intake end. The head is a No. 3 Avey.

3—Drilling the carbureter manifold flange on a multiple spindle head. Two holes are drilled. The work is located by the bore on the intake end and by the cored hole in the outlet end. There is a taper locating plug on each end of the jig for location. The head is a No. 2 semi-automatic. Operations 2 and 3 are performed by one man.

4—Boring the intake and outlet ends. The work is handled on a turn-over jig with a No. 3 plain head with power feed. The location is by means of the two flange holes and the hot air tube bore.

5—Reaming the intake and outlet ends on a stationary fixture, the mixing chamber being turned over by hand. This is done on No. 2 plain head and the operations 4 and 5 are done by one man.

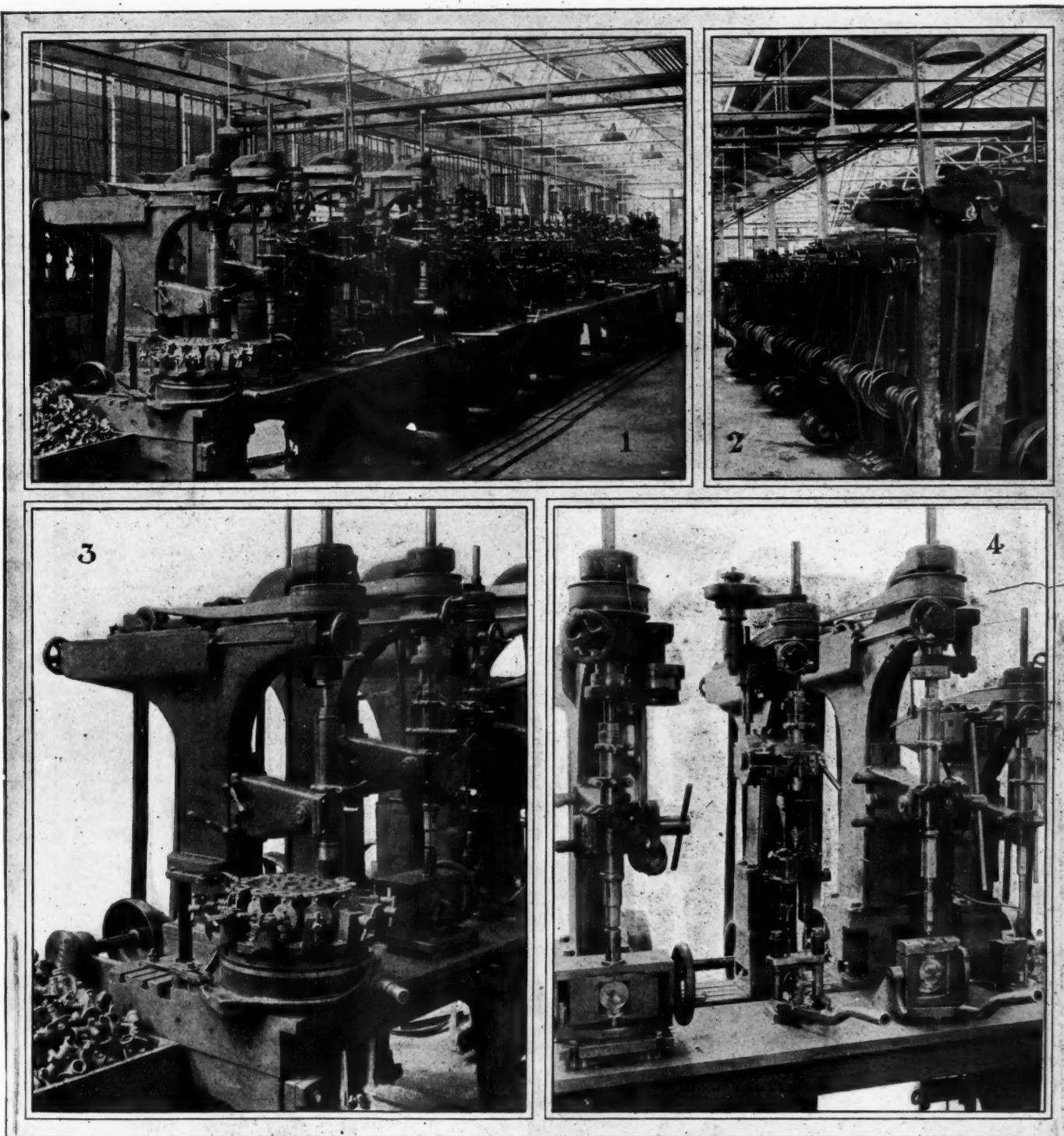


Fig. 1—Single table unit at Holley Manufacturing Co. capable of turning out 150 mixing chambers per hr. This unit is 50 ft. in length and takes care of thirty-six operations with twenty-one men. It is equipped with standard Avey drill press heads capable of being moved along the table to suitable positions for manufacture. Fig. 2—Back of Holley drill head installation, showing power drive. Shaft is provided with keyway to allow pulleys to be shifted along the line to accommodate the positions of the drill heads. Fig. 3—Operations 1, 2 and 3. Milling fixture at end is a continuously rotating type from a Cincinnati milling machine holding twelve mixing chambers at a time. Fig. 4—Operations 2, 3, 4 and 5 in the manufacture of the Holley carburetor mixing chamber

6—Rough boring the venturi on a stationary fixture consisting of an upright peg and two dowels which fit in the bolt holes. The work is done on a No. 2 semi-automatic head.

7—Facing off the bowl flange on a No. 3 head. The location in from the bore in the intake end and from the two flange holes on the outlet end. A pneumatic cylinder on the jig operates the clamping plungers and a spe-

cial facing cutter is used for this work. Operations 6 and 7 are done by one man.

8—Drilling the adjusting needle hole. This is done on a No. 2 semi-automatic head and the work is held in a pump jig locating from the bowl flange.

9—Counter-boring and facing the adjusting needle stem. Done on a No. 2 semi-automatic head with a stationary fixture locating from the bowl flange. The coun-

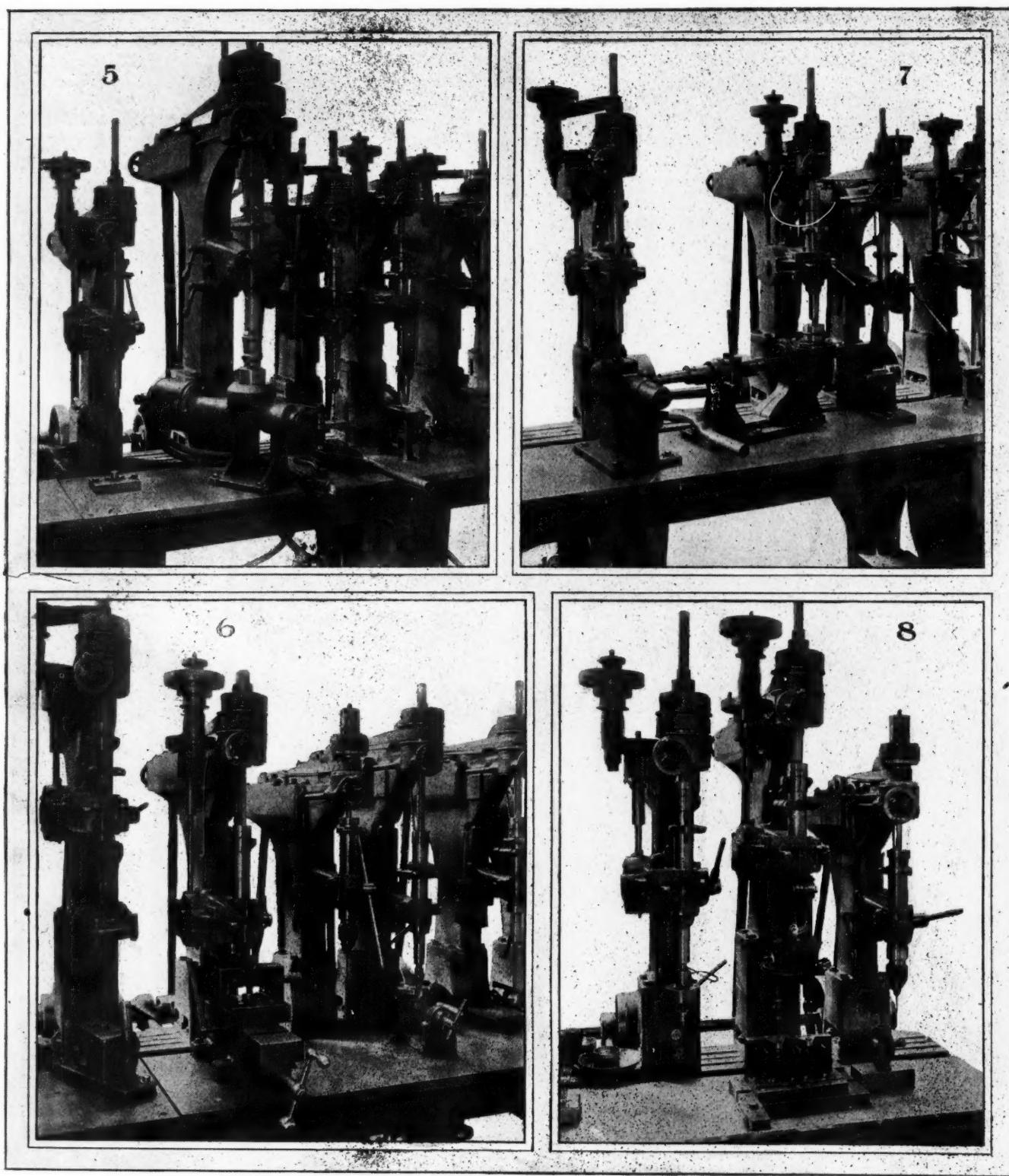


Fig. 5—Holley mixing chamber operations 6 to 10. Fig. 6—Five operations, numbers 12, 13, 14, 15 and 16, in the manufacture of the Holley mixing chamber. Fig. 7—Operations 23 to 26. The hollow milling operation shown herewith is performed on a special drilling fixture made in the Holley tool room. It is a stationary fixture with vertical and horizontal spindles operating simultaneously. Fig. 8—Last three operations in the manufacture of the Holley mixing chamber. Described in the text

ter-boring and facing operation is handled by a combination cutter. Operations 8 and 9 are done by one man.

10—Drilling the lower stem on an Avey No. 2 semi-automatic head with a special stationary fixture locating from the bowl flange and clamped vertically.

11—Counter-boring and facing the lower stem with the same kind of fixture as in 10. A combination cutter

is used on this work and the location is from the bowl flange in the same manner as operation 10. Operations 10 and 11 are performed by one man.

12—Drilling the inlet elbow hole and inlet throttle rod holes. This work is done on a No. 2 semi-automatic Avey head with a No. 2 spindle Buhr gear-driven drill head. A stationary drill jig is employed with the loca-

tion from the inlet and outlet holes and a spray needle hole. Operation 12 is handled by one man.

13—Milling the pad for the float lever bracket. This is done on a special sliding milling fixture with cross-feed and located by the bowl flange, the work being held in place with vertical pressure on the spray needle stem. This is a No. 2 head. Operation 13 is performed by one man.

14-15—Drilling inlet throttle hole and counter-boring and facing intake elbow hole on two No. 2 Avey drill heads with a loose tumble jig, locating from the intake and outlet holes and from two dowels in the bolt holes. Operations 14 and 15 are on similar machines side by side and are performed by one man.

16-17—Drilling and counter-boring the inlet seat holes on the No. 2 Avey head. A loose jig is used also for these two operations locating from the bowl flange. Operations 16 and 17 are performed by one man.

18-19—Drilling float lever bracket holes and two vent holes on No. 1½ high speed drill head, with a loose jig, which is also utilized for operations 16 and 17; that is, the loose jig is passed from 16 to 19, back and forth. Operations 18 and 19 are performed by one man.

20—Drilling primary air passage hole. A stationary jig locating from both flanges is used for No. 1½ head.

21-22—Counter-boring and tapping hole for primary air passage. This is done on two No. 2 Avey heads with a loose jig locating from both flanges. Operations 20, 21 and 22 are all performed by one man.

23-24—Hollow milling inlet and outlet throttle lever stop lug. This operation is performed on a stationary fixture with vertical and horizontal spindles working simultaneously. The fixture is a special drilling fixture made in the Holley tool room and operates with a No. 2 Avey head. Location is from a peg entering the inlet hole and on a peg and two dowels in the outlet hole and two flange holes. Operations 23 and 24 are performed by one man.

25-26—Ream and face inlet and outlet throttle rod holes and lug. This is performed in stationary jigs locating from the two ends of the mixing chamber on a No. 2 Avey drill press. Operations 25 and 26 are performed by one man.

27—Drilling low speed hole locating on outlet and outlet throttle rod hole on a stationary fixture. This is done on a No. 1½ high speed drill head by one man.

28—Ream and form venturi opening. This work is done on a No. 2 head with a pump jig locating from two flange holes and a peg in the outlet hole. Operation 28 is done by one man.

29 and 30 are similar operations to balance production speed along the line. The work is drilling the low speed holes and it is done on a loose turn-over jig on a No. 1½ Avey drill head. Operations 29 and 30 require two men.

31-32—Tapping lower stem and tapping inlet valve hole on Avey No. 2 head. The same sliding jig is used for both these operations locating from the outlet end and the two flange holes. Operations 31 and 32 are performed by the same man.

33-34—Tapping the upper stem and inlet elbow lug hole. These two operations are done on two No. 2 Avey heads with a sliding fixture taking care of both operations. The location is from the outlet hole and the two flange holes. These two operations are performed by one man.

35—Drilling the primary air passage hole in lower stem. Two pieces are done at one time on this work with a two-spindle, multiple head on a No. 2 Avey drill press.

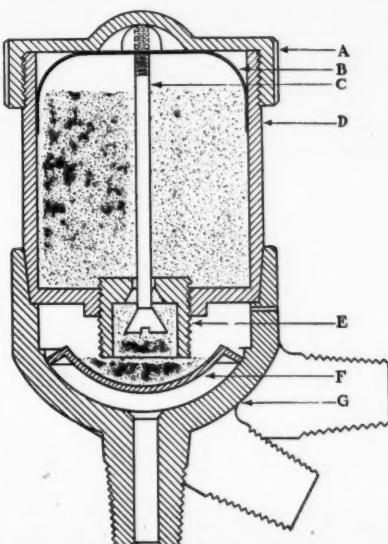
36—Reaming the primary air passage on the lower stem on a No. 2 drill head. The location is from a peg in the lower stem. Operations 35 and 36 are performed by one man.

These 36 operations, while applying, of course, strictly to this one product, nevertheless are varied enough to show that this system can be utilized for the manufacture of a great many small parts which are now made on miscellaneous types of machines of various shapes and sizes scattered over considerable area. The neatness of a plant with common table height and these closely adjacent, similar machines is noteworthy. The efficiency of handling the work in process is the most notable result. Even if it were not for the fact that this has a very large psychological effect on the work turned out, it is certainly productive of pleasing results.

The Vanoiler Automatic Oil Cup

THE illustration is a sectional view of a new automatic oil cup placed on the market by the Advanced Products Corporation. The device is known as the Vanoiler and is the invention of A. A. Van Orsdale, president of the company. For its operation the Vanoiler depends upon the vibration of the car, and its delivery of oil is said to be in direct proportion to requirements. When car is not running, lubrication ceases.

Referring to the sectional view of the Vanoiler herewith, when cap A is screwed down tightly on cup D, it presses on steel spring B, which releases valve



C and starts the oil to flow into the pan F. When the machine is at rest an automatic seal is formed, which keeps the oil from running through the bottom of the cup G. When the car is started, however, there is sufficient vibration to cause an overflow of oil from pan F, which continues as long as the car is in motion. The amount of oil fed to the bearings can be regulated by means of the adjustable centerpiece E, which can be screwed up or down, thus raising or lowering the oil level in pan F.

The chief advantage claimed for the Vanoiler is that oil is fed only while the parts are in motion; that is, while lubrication is required. Several other models, including a visible one and a battery or central reservoir model, are in process of development at the present time.

AN improved distributor for high tension ignition systems has been patented in England to M. Strobel of Frankfort-on-Main. In this both the fixed and movable distributor "points" are made of metallic tungsten, which is said to have proved most durable and reliable for the purpose. The distributor is of the open gap type, hence the points are subject to the action of the spark.

Cleaning as an Essential Manufacturing Operation

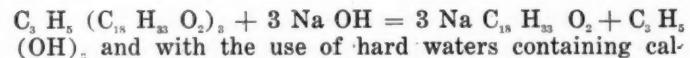
A saving of five hundred dollars a month has been effected by an Ohio truck manufacturer through improved method of cleaning materials. The following article contains an analysis of the methods used and an appraisal of their value that is worthy of special attention.

By A. W. Endter*

PRIOR to the advent of the automobile industry, manufacturers in general gave little thought to their cleaning problems and less to sanitation and working conditions. But with the entrance of this industry, upon a production basis, cleaning of parts in process, and sanitation in general, began to cause executives no little thought, mainly, at first, from an economic standpoint of dollars and cents, and secondly, to comply at least with the Inspector of Workshop's Code.

Soap and water, the product of a century before, were depended upon at this time for all cleaning processes. When they failed, lye, sal soda (Na_2CO_3) or some of the petroleum products, as benzine, gasoline, kerosene or naphtha, were employed as reserve forces.

The alkalies, the first mentioned in the above list, depended upon the use of saponifiable oils for their effectiveness, the reaction being known in soap manufacturing as saponification. The ethereal salts of the oils, known as olein, reacting with the hydroxyl radical of the alkali as follows:



cium carbonate ($CaCO_3$) in solution, such as we have in most manufacturing plants, the equation becomes even more complex and an insoluble soap is formed, which is very hard to remove.

As a cleaner of mineral oils from metals, the solvent properties of some of the hydrocarbons, as listed above, had long been known and, one in particular, gasoline, came into prominence at this time for several reasons. It was cheap and easy to handle, although its dangerous properties were known.

The usual method at first for cleaning with gasoline was merely to provide a bucket or, if necessary, a tank where the worker immersed the parts to be cleaned and brushed them with a stiff brush, or if cleaning small parts to use a perforated container in dipping, which allowed the gasoline and dirt to drain off.

Objections soon arose against using gasoline, primarily because of the danger of fire. Secondly, where buckets would not suffice and tanks were used, the evaporation was so great as to be expensive. Thirdly, if the gasoline was not changed frequently it became so saturated with oil that the parts would be covered with a film of oil after the gasoline evaporated, thus leaving them unfit for painting, plating or soldering. And last, the labor cost of

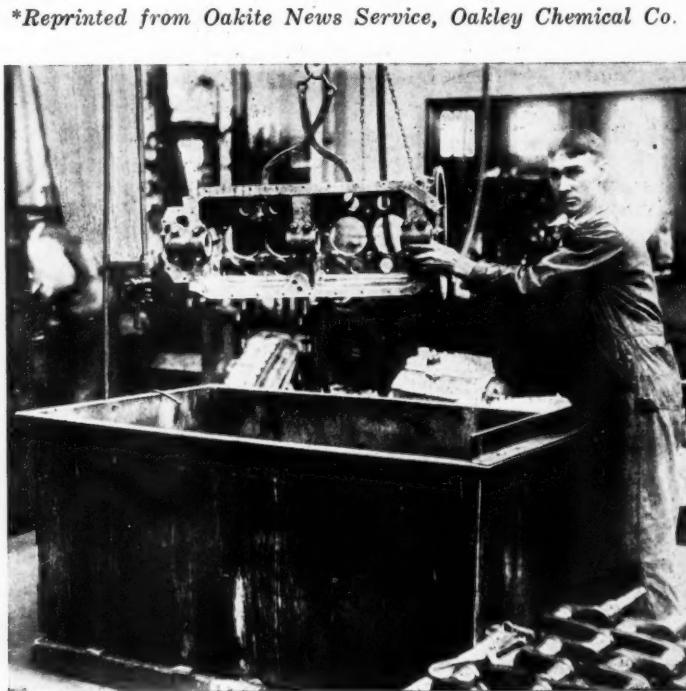


Fig. 1—Cleaning crankcase in motor assembly room for progressive truck assembly

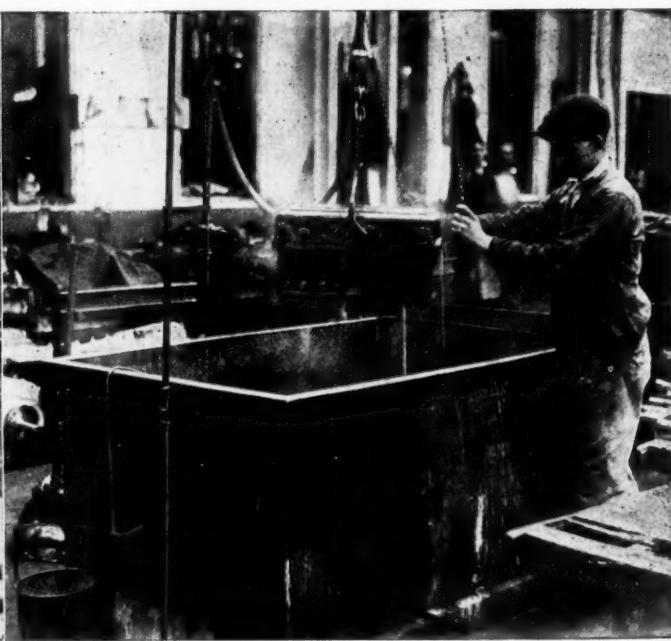


Fig. 2—Cleaning gray iron cylinder blocks for motor assembly track

hauling parts to and from the gasoline tank was enormous.

It is interesting to note the experiments undertaken by some of the older automobile concerns in further trying to adapt gasoline for cleaning purposes. Consider, as an example, one of the pioneers in the business. Finding the methods of using gasoline unsatisfactory, this firm rigged up a novel apparatus.

A gasoline tank was suspended overhead, which could be lowered by a block and tackle for refilling, and a hose connected to it and run to the workers' bench. Another hose, connected with the compressed air line, joined the gasoline hose in a double spraying nozzle. The gasoline, fed by gravity and also accelerated by the air, formed a fine mist from the nozzle, with which the work was sprayed.

This method had many advantages over the former, as the air blew the chips and dirt off after the gasoline had dissolved the film of oil; but one serious objection, not encountered before, arose. After a few hours of spraying the air in the room became so saturated with fumes that the workers complained of headaches and dizziness and upon investigation it was found that they were in a state of semi-asphyxiation. Along about this time, through the experiments conducted by a certain chemical company, cleaning problems had been analyzed and solved on a scientific basis. So successful were the results in all departments that we immediately adopted them throughout the plant.

To enumerate all the cleaning operations in which we have been successful would be beyond the scope of this paper, and we shall mention, therefore, only the most important and typical.

In Fig. 1 will be seen the cleaning of an aluminum crankcase in the motor assembly room. Here we have a metal tank of approximately 340 gallons capacity which usually contains 225 gallons of water cleaning solution. The solution is heated by a gas burner underneath the tank and the temperature maintained at 150° F. The crankcase, after the bearings are scraped in, proceeds down the track (seen in the rear of the picture) and as it reaches the tank is grabbed by a pair of tongs, lifted by an overhead air-hoist attached to a roller conveyor and moved to the tank. Several dippings suffice to clean off all chips and oil and the case is replaced on the track carriage. The heat, absorbed from the solution, dries the case by the time it is back on the track, and the work of inserting the shaft and fitting the cylinder blocks begins immediately. We have eliminated a rinsing tank by keeping our solution at a certain density and temperature, thus preventing crystallization when cooled.

Fig. 2 shows a gray iron cylinder block being cleaned. The cylinders move from a sub-assembly bench at the side of the tank and are lifted right into the tank, from which they are then conveyed to the track and placed on the crankcase, as mentioned above.

In the lower right-hand corner of Fig. 1 may be seen a truck load of crankshafts, which have just been cleaned. This is an operation which taxes the capacity of the solution, as the anti-rust coating put on these shafts by the manufacturers to prevent rust in shipping is extremely hard to remove. The high lights in the photograph testify as to the effectiveness of the cleaner.

With our former method of using gasoline it took two men 10 hours to clean 40 shafts. We now do the same work in 1 hour, saving 25c. per shaft in labor alone.

Another one of the most difficult cleaning operations we had to contend with was cleaning radiators in our sheet metal and repair departments, prior to soldering.

The accumulation of dust, oil and lime made it impossible to solder them unless cleaned thoroughly. Fig. 3 shows our method. Here we use a stronger solution and



Fig. 3—Cleaning radiators before soldering

allow the radiator to soak for 15 minutes, after which it is rinsed and ready for soldering.

In our grinding department we experienced considerable trouble with sal soda, because the work rusted, and the water, through evaporation, caused the solution to become so concentrated that the sal soda crystallized on the work when dry. The workers, moreover, complained of skin infection, due to working in this strong, filthy caustic solution. We remedied this by using a weaker solution of cleaner, similar to that used in our tanks.

For all screw-machine parts and steel stampings we used a small tank, heated as before, and a perforated container, which allows the solution to drain off the parts.

Regardless of the cleaning method used, the manufacturer of to-day is most vitally interested in comparative costs. While using gasoline for cleaning purposes we averaged fifty gallons a day. At the present market price this amounts to \$15 a day, and with twenty-five working days to the month, \$375 per month. We use approximately two barrels of cleaning compound per month at a cost of \$90, or a difference of \$285 saved per month in materials alone. If to this is added the labor expense saved by the new method the total saving will approximate \$500 a month.

Vibration Periods of Hispano-Suiza 300 Hp. Engine

IN tests made on the 300 hp. Hispano-Suiza aviation engine at McCook Field it was found that there were two very definite vibration periods of 800 and 1200 r.p.m. The vibration may be described as a slight rocking movement accompanied by a violent horizontal movement. There was practically no difference in the vibration of the engine when "motored over" by means of an electric motor and when it was running under its own power. The conclusion was drawn that the cause of these periods is the unbalanced inertia force in the horizontal plane. Staying the cylinder blocks from the crankcase stopped the vibration, and the best remedy for this condition encountered in airplane installations would consist in the use of a much wider engine support base and cylinder blocks securely tied to the support.

What Makes a Labor Policy Successful?

A successful labor policy cannot be developed over night; it is a process of intelligent and well-directed growth. The spirit and common-sense behind it are more important than the mechanical form it takes. Industrial democracy is the form in the plant described; other factors discussed.

By Norman G. Shidle

THOUGH less acute at present than for several years past, the problem of labor and human relationships in industry is still potentially of vast importance. The very fact that labor is plentiful just now should draw added attention to building up an effective labor policy, since the task can be accomplished under more favorable conditions. Such a policy is essential to the manufacturer who is to go forward successfully in the era of more intense competition.

And students of present-day industrial affairs know that the old hammer-and-tongs labor policy will never suffice again. Bismarck is dead; so is Machiavelli; neither blood-and-iron nor an opportunist policy of using any means, good or bad, to attain a desired end can gain success in the conduct of industry's human relationships.

In a broad way the path toward the development of proper industrial relationships has been defined. Mr. Tipper's articles in *AUTOMOTIVE INDUSTRIES* are among those which point the way. It is only through a long period of investigation and actual experiment, however, that practical means of keeping to that path can be worked out. Consequently, the study of industrial relationships in plants which have had more than ordinary success in this line constitutes a valuable part of the work toward the best ultimate developments.

It is with this idea in mind that the achievements of certain firms have been outlined from time to time in *AUTOMOTIVE INDUSTRIES*. The articles are conceived as laboratory examples, useful chiefly for examination and criticism and perhaps as suggesting some policies suitable for wider adaptation. The present article deals with the labor policy of a firm which now has in use an industrial democracy plan, but discusses as well numerous other factors which the writer believes to be equally important in the harmonious condition which prevails.

The successful working out of industrial relationships at the Greenfield Tap & Die Corporation is the result of a long period of growth and the consideration of a number of factors. These may best be discussed one at a time.

The tradition behind the organization has some bearing upon present industrial relationships. Every plant begins to build tradition the day it starts operations. That tradition is certain to have some effect, be it good or bad. In this case, the tradition evolved has been favorable to the growth of friendly relations between employer and employee.

The great-great-grandfather of the present corporation began operations in Greenfield in 1872—49 years ago. This ancestor, the Wiley & Russel organization, employed about 43 workmen. In a direct line from that company, sprang the Wells Brothers & Co., which, beginning about 1876, employed a small number of men for some years. Thus, the beginnings of the corporation centered around small units where the master and man relationship flourished. The tradition began with a mutual understanding and mutual co-operation.

The tap and die industry developed through the years until finally a number of plants manufacturing these articles and other articles closely allied grew up in Greenfield. In most cases the men at the head of these plants had formerly been a workman and began in business for himself by employing a number of men who had formerly worked beside him in the shop.

The corporation began as a consolidation of two companies in 1912, the Wells Brothers Company and the Wiley & Russel Manufacturing Co. The present Greenfield Tap & Die Corporation comprises seven separate units, all of which retain their original names, although organized and administered under one head.

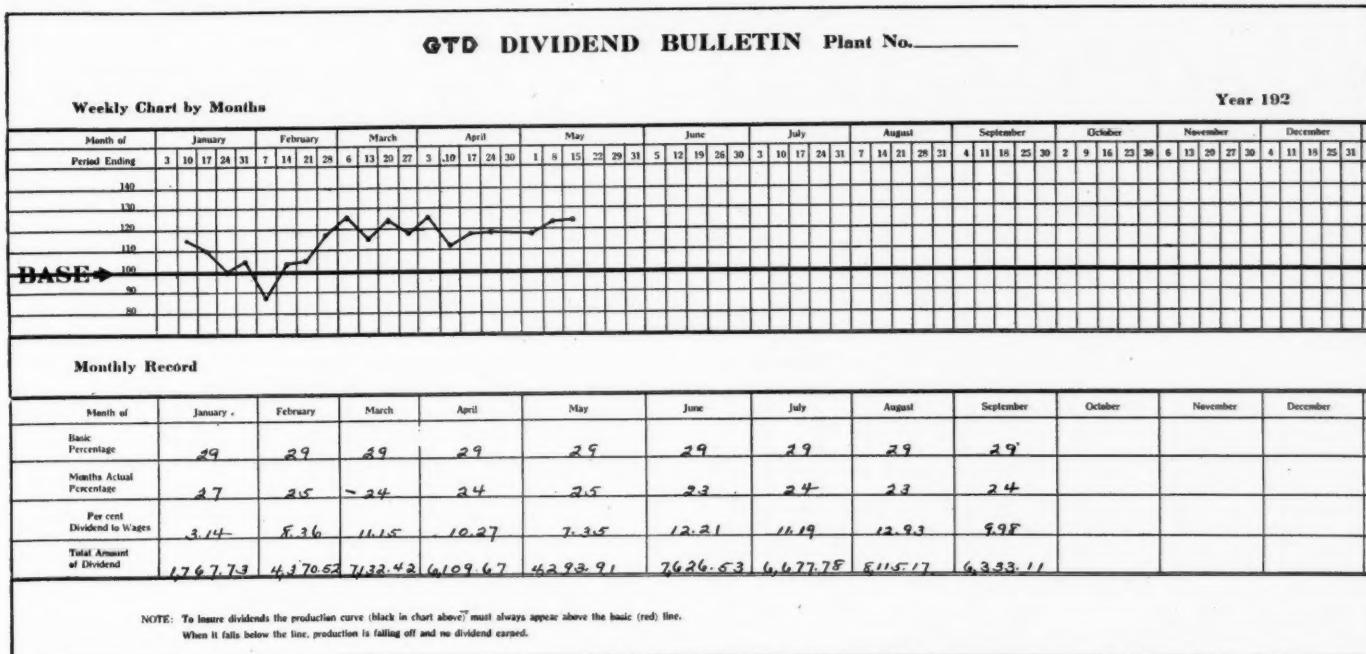
This brief account of the tradition behind the corporation is necessary to a proper understanding of the later developments. One important feature should be noticed. The tradition described comprised among other things a tendency among these older workmen to remain with the same company year in and year out; fathers brought their sons to work in the shop, and every one felt like one of the family. So much for the old days.

Important in the growth as well as in the present development of this corporation is the town in which the plants are located. Greenfield now has 16,000 inhabitants. While it is greatly taxed for housing facilities, the company has done much toward meeting the situation. A hundred houses are now being constructed by a housing corporation, extensively supported by the corporation. The town is located in the midst of Massachusetts' justly famous hills, and natural beauty abounds on every side. The plant itself is pleasantly situated about five minutes walk from the center of town; the view from any shop or office window is pleasant and gratifying.

In short, all the advantages of small town manufacturing are present and aid in making fertile the ground upon which to develop amicable industrial relationships. The pleasant surrounding, the ease of going to and from work, the comparatively lower living expenses, and the natural close associations of a small town all operate to the benefit of the manufacturer, as well as the employee.

It is easy to belittle the practical effect of such things as tradition and physical surroundings, yet a survey of a great number of typical cases inevitably impresses the fact that their effect is very definite. Such things are not, of course, all powerful; they do not in themselves reduce labor turnover and eliminate industrial trouble, but they are important units in the foundation upon which the structure of proper industrial relationships is to be built.

On this fertile ground, then, the Greenfield Tap & Die Corporation has built an excellent structure. One factor of importance is that of providing steady and continuous employment for the workers. Employed in the seven plants are about 2000 men, most of whom are natives of Greenfield or surrounding towns. Unemployment under such conditions becomes a very serious matter. Every



1. Chart on which production record is presented to workmen

effort is made to provide continuous employment, and throughout some of the worst of "bad times" this organization and its predecessors have been able to keep their working force practically normal. At the present time it has not reduced its personnel nor have wages been cut. This one fact in itself means a great deal to the intelligent workman.

It may truthfully be said by some manufacturers that they would gladly give their men continuous employment if sales held up and production could be marketed. In such cases, the manufacturer who is unable to do this, though it may be no fault of his own, is simply likely to find himself "up against it" as regards industrial relationships in good times, when the workmen naturally hold to the manufacturer who was able, as well as willing, to help them during bad times. This is a practical and not a moral question—and the facts are practical as well.

Though the organization is now a comparatively large one, *care has been taken not to lose the individual touch*. This effort is facilitated somewhat by the fact that the work is still done in seven separate plants, each comprising a comparatively small unit. An industrial relations department, established some years ago, facilitates the close touch between management and men. This department was established before the touch was lost; the firm did not wait until it had trouble on its hands. Consequently the ground for its work was to some extent prepared. And it has been possible to keep that touch. The men are still individuals.

A suggestion system is used, for instance, similar to that in vogue at many other plants. Many of the suggestions regard safety, health, sanitation, etc., as is usual. Forty per cent of the suggestions here, however, relate to production methods and a great number of minor changes, each resulting in slightly increased production, have been made as a result of suggestions made by the men. Though each suggestion is small in itself, the aggregate is of considerable value to the management. A detailed story of these suggestions is worth several pages in itself, not merely as an example of the interest shown by the men, but as containing practical suggestions to other manufacturers for improving certain details of their production methods.

A trip through one of the shops impresses upon the visitor that this family spirit and individual interest in craftsmanship has been preserved without any lessening of efficiency; in fact, production has steadily increased. An incident occurred, while visiting the Wells Brothers plant, for instance, which impressed the writer very forcefully, not only for its individual significance, but as an example of what has been accomplished in the direction of preserving individual interest and initiative.

We approached a big Greek workman who was engaged in mottling tap wrench handles. This operation consists in dipping the finished and polished handles into pots of specially prepared chemical heated to an extremely high temperature. The handles are then removed and placed immediately in cold water. The result is to give the handle a beautiful mottled appearance, comprising some three or four different colors.

We watched the work for a moment without making any comment. The workman saw our interest, carefully cooled one of the pieces he had just completed and handed it to the writer for his inspection.

"See," he said, "four colors; I can get four colors. The better polished, then get better color. Must have him just right, though. And no water on him. Any water, boom, he blow up when dip him in the pot."

When the writer admired the work the workman went on to explain how the process was done in detail; to tell what constituted good mottling, and what was bad mottling. He told of possible accidents; narrated how he had once been burned himself, and stated that no one would get hurt at that job if he were simply careful. Through all of his explanations he spoke eagerly and enthusiastically, this Greek with a long mustache that made him appear as though he had certainly been cast to play the villain in a melodrama. But, withal, he reminded one more of a child relating to his fellows some wonderful discovery that he had made. Never, in office or shop, has the writer seen anyone as enthusiastic and interested in his work as was this man.

And he had been working on this job 40 years!

The story is of an exceptional man, it may be objected. To some extent that is true. In another sense it is not. For we talked to other workmen, to other foremen, and

in every case that same interest was displayed to a far greater extent than is common in most organizations. While work is run through these shops systematically and with all the efficiency of a modern industrial organization, there is something different about the way it is done.

When you get to Greenfield, you feel a quiet contentment about the whole place; a friendly spirit seems to radiate even from the table of the little lunch room where you may stop for an early breakfast. And perhaps the spirit of the shop may be best described by saying that as you go through it and talk to men here and there, you still feel as though you were in Greenfield.

The department of industrial relations has been mentioned. It functions in connection with all the plants. A list of its activities shows little that is not common to many other organizations, but its methods differ from the majority. It has operated for several years, and is fortunate in having at its head a man who is capable of being an honest and sincere friend to both workmen and management. This is not an easy task, and it may as well be frankly admitted that the success of an industrial relations department is likely to succeed or fail on the basis of that man's qualifications for the position he fills.

Wages at this plant have been slightly higher than in some other New England towns, and as high as any. They have not been cut. Many of the men work on a piece work basis, and it is the policy of the company never to cut a piece rate unless the operation itself is definitely changed.

On top of these wages, a production bonus system gives the men a definite share in increased production. This system operates by plants, and production figures are posted weekly in all departments to let the men know exactly how they stand. Fig. 1 shows the form on which the figures are posted. The base line 100 indicates normal production. This was determined several years ago by taking the average for several normal months. The men share 50-50 with the management the proceeds from the production made above that normal. The figures posted on the chart indicate the employees' share.

This plan has had a definite effect upon increasing production, and the interest of the men has been greatly stimulated by the chart presentation. Moreover, labor turnover averages only 60 per cent yearly and strikes and labor disturbances are unknown. These results, though briefly stated, are of vast importance.

An industrial democracy plan has been in operation for about a year and is considered by both management and men to be succeeding. Its powers are confined to making recommendations which must be approved by the management in order to become effective. It is significant, however, that thus far no recommendation has been vetoed by the management. On two or three occasions a recommendation has been returned by the management to the workmen for reconsideration. In each of these cases the workmen have seen the justice of the management's argument and have withdrawn the recommendation.

The chief virtue of the plan is that it provides a regular and normal means for intercourse and interchange of ideas between management and men. It is human nature to chafe under restraint. The man who is likely to think himself unjustly treated when he has no chance to air his grievances may never have a grievance when he knows that there is ample provision for him to state it at any time. This normal means of allowing chosen representatives of the workmen to come into regular contact with the management, to present ideas, suggestions, and grievances is an effective method of gaining mutual co-operation and benefits.

The particular system of industrial democracy itself is not very different from that used in a number of other plants. It is described briefly and clearly by Robert P. Dolan, the Industrial Relations Manager of the Greenfield

Tap & Die Corporation, in an article written recently for "Industry." A part of that description follows:

"The organization is made up of a Legislature, Judiciary and Executive Council. Legislature: This body is composed of employees representatives elected by secret ballot from each department on the basis of one to every twenty workers. The primary purpose is to offer suggestions for the betterment of working conditions or improvement of manufacturing methods and to deliberate on all suggestions that may be referred to them at the option of the upper bodies. The Legislature has for its officers a President, Vice-President and Recording Secretary, elected from its membership.

"Judiciary.—This is composed of foremen, assistant foremen and department heads. Their function is to interpret and sift the suggestions of the Legislature, and to further make recommendations submitted for their consideration by the upper bodies. The Judiciary has for its officers a President, Vice-President and Recording Secretary elected from its membership.

"Executive Council.—This includes the Works Manager, Superintendents and general foremen. Their function is to consider suggestions received from the lower bodies and refer them to the Chief Executive or Executive Officers with recommendations. They also consider recommendations referred to them by the Chief Executive or Executive Officers.

"Chief Executive or Executive Officers.—These are the President, Vice-President or Board of Directors of the Corporation. It is their duty to consider and act upon all suggestions and recommendations referred to them by the lower bodies. They may also refer to the lower bodies any matters which they see fit.

"Joint Committees.—From the Legislature and Judiciary are elected four joint committees composed of six members each, three from each body as follows:

"Committee on Industrial Co-operation and Conciliation, whose duties are to bring up matters for discussion at their conferences of their own initiative, or to discuss matters referred to them for their consideration pertaining to the prevention and settlement of industrial disputes, conditions of employment, reported grievances, appeals from discharge, etc., as well as to establish rules and regulations for the maintenance of discipline.

"Committee on Safety and Accidents, whose duties are to bring up for discussions at their meetings, matters of their own initiative or suggestions referred to them pertaining to accidents, the safeguarding of machines, fire protection, first aid, fire drill, etc.

"Committee on Health, Sanitation and Housing, whose duties are to discuss matters of their own initiative or matters referred to them for consideration pertaining to health, physical examinations, medical treatment, sanitary toilets, wash and locker rooms, rest rooms, sanitary conditions in the factory, and in relation to housing problems and its environs, restaurants, etc.

"Committee on Recreation, Education and Insurance, whose duties are to bring up matters for discussion of their own initiative or to discuss matters referred to them for consideration pertaining to social activities, club houses, play grounds, entertainments, athletics, technical education, manual training, sick benefit, insurance, etc., and further to work in close co-operation with the Advisory Board on Social and Industrial Betterment.

"Each of the joint committees has a chairman elected from its membership.

"Personnel Secretary.—Our Industrial Relations Manager acts as Personnel Secretary for the Associates and is a member ex-officio of every committee. It is the duty of the Personnel Secretary to act as the pivot upon which all these activities and committees depend and be a clearing house for all suggestions and business transacted. He sits in at the meetings in an advisory capacity to interpret the Corporation policy.

"Meetings of each of the committees are held regularly on specified dates."

The reader interested in more details concerning the actual machinery of this plan, together with its operation in connection with each of its various functions, will find an excellent treatment of this particular industrial democracy plan in *Machinery* of July, 1920.

It is not by chance that the industrial democracy feature of this corporation's personnel activities has been treated last in this article. It has been described last because it is the last step in a process of development that has been going on, unconsciously perhaps, for many years. The plan is succeeding at the Greenfield Tap & Die Corporation, according to the officials of that concern.

That success has undoubtedly been dependent to a large extent upon numerous other factors. The ground had been properly prepared for such a development. The best of relations existed between management and employees at the time of its installation. An industrial relations department had paved the way by putting over the "square deal" to the men from the management; it had already gone far toward winning their confidence in the integrity of the management, in its justice and its desire to be on the level. Added to this was the everlasting fundamental fact that the management had been on the level.

Thus when the "square deal" statement, which precedes the industrial democracy constitution, was put up to the men, they knew from past experience that they might expect to see that theory worked out in practice; that it was not propaganda given to them under the guise of education or self-government.

The plan was examined and voted upon by the workmen before it was installed. Had they voted to reject it, that would have been the end of the matter.

The success of this industrial democracy plan is indissolubly bound up with many other factors; it is a progressive step made after many other steps in the same direction. The purpose behind its installation was honest, the method of putting it in intelligent, and the methods used in administering it sensible. Consequently it is a success.

Neither this nor any other industrial democracy plan or scheme will solve the industrial problem of a plant unless the other factors are right as well. The form of the plan or scheme itself is comparatively unimportant.

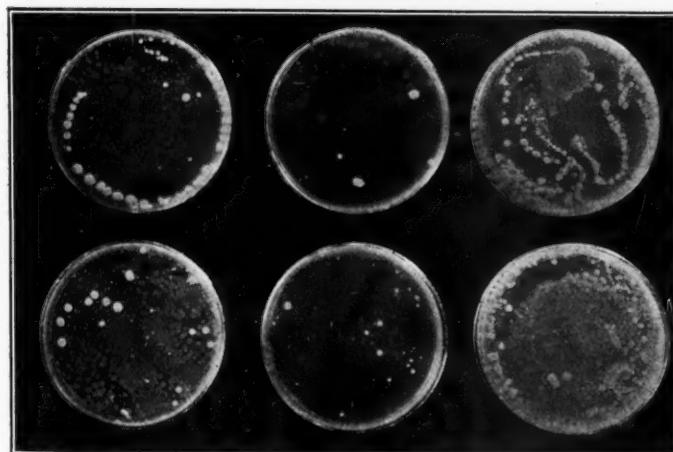
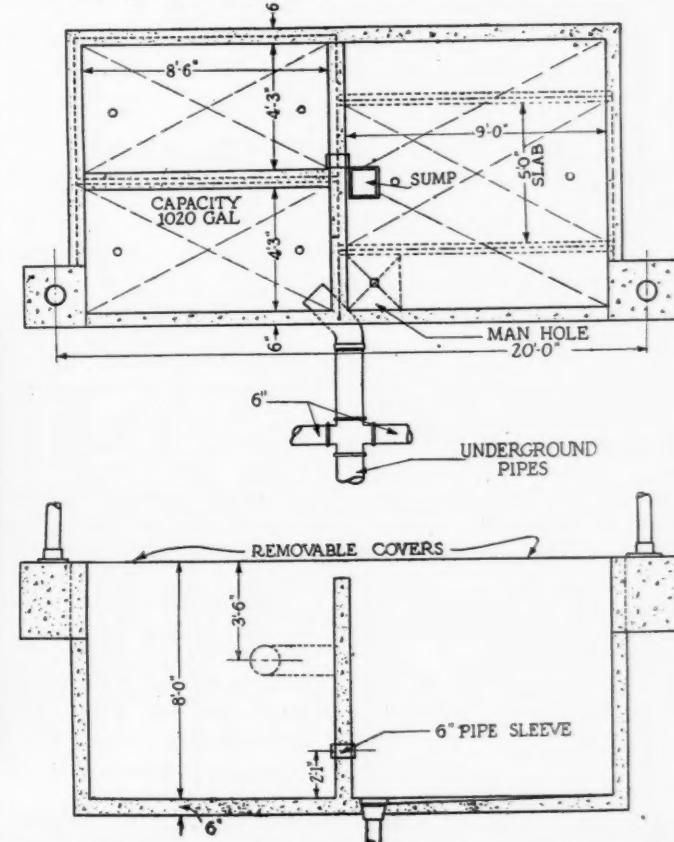
Henry S. Dennison, president of the Dennison Manufacturing Company, has an industrial democracy plan in his organization; the organization is a large one and its president one of the keenest thinkers along industrial lines in this country.

In conversation, he said a short time ago, "All this talk about this or that scheme or plan for industrial democracy as a solution for industrial troubles is foolishness. Industrial democracy in itself is simply the thirty-fourth or thirty-fifth stone in a gradually built up structure; if any one of those other stones were missing the whole structure would topple to the ground. The form of industrial democracy is unimportant; it is the spirit behind it, the steps that have gone before that are essential."

Sterilization of Cutting Solution

AMONG the problems entering into machine manufacture is the proper sterilization of the different solutions used for turning operations, to prevent infection. The Ford Motor Co. has installed large concrete pits with steam pipes running through them, to solve this problem. The cutting solution is pumped into the machines by means of pumps and supply pipes, and returned to the pit for sterilization. The solution is sterilized in the pits, once each week, by heating it to 148 deg. with the steam pipes, and maintaining that temperature for one half to one hour. The installation of the tank equipment is shown in the drawing herewith. The tanks are beneath the floor level, covered by removable slabs. There is a sump at the

bottom of the tank in which the pump operates, so that it is always primed regardless of the level of the fluid.



Micro-photographs showing bacteria in cutting solution. Right hand row shows bacteria in cutting solution of uncleaned machines; center row, sterilized cutting solution in pit; left hand row, sterilized cutting solution contaminated with bacteria from uncleaned machines

1—Sterilizing tanks for cutting solution in camshaft department of Ford Motor Co.

Highway and Cheaper Fuel Promotion Needed in Our Export Fields

Here are some important suggestions from an export manager who has spent two years in foreign fields. Of course, the idea that we should do something besides sell cars there may be startling to some manufacturers, but it is worth a thought. Other notes of interest from foreign fields.

AMERICAN automobile manufacturers should not expect too much from the foreign markets without giving more attention to the development of these markets by way of road propaganda and a more complete study of the foreign field, is the opinion of James E. Burke, export manager of the Stewart-Warner Speedometer Corp., who has just returned from a two-year study of nearly every important country of the world.

Mr. Burke cites as an example New Zealand, with a million population and having at least 25,000 motor vehicles, gasoline at \$1 per gallon and cars costing from 50 to 75 per cent more than they would sell for in the United States. These latter two factors are naturally important ones, and if the domestic market had to face them, it would better appreciate the resistance they offer to sales. Not only roads, but cheaper fuel is essential. When the entire area of the world, outside of Europe, is considered, the road conditions are not comparable with those in America and in the East; there are very few large cities with comfortable motoring conditions outside the main part of the city.

Mr. Burke considers India a great market for practically any kind of a car. The country has 320,000,000 population, a fair system of roads in places, and offers special possibilities.

In Japan, the Government is actively engaged in a road-building program, the country having recognized the necessity of motor apparatus and highways.

China has practically no roads outside of the cities, the waterways having been extensively used. He estimates approximately 4500 cars in a few of the main cities.

Java, with its population of 30,000,000, has been a good car center, practically all of the Dutch planters being buyers. The Chinese merchants have a pretty large hold of the accessory trade on this island. In single-commodity countries, such as China with its silk industry, or Brazil with its coffee industry, the export situation must be more carefully studied, as the problem is more difficult than in a country that relies on a variety of products such as agriculture, manufacture, cattle raising, etc. Mr. Burke believes that the motor car market abroad for American cars is a promising one, but that the conditions of the different countries must be studied.

Generally speaking, the dealers are of a very substantial character and, if given that consideration which export trade deserves, constitute good representation. The truck business is generally slow in all parts of the world, as the business is just getting under way.

A Thought for Mexico

AS the period of readjustment continues throughout the automotive industries, the fact becomes apparent that many manufacturers, in seeking to enroll their

names upon the scroll of foreign trade, have gone after business in the far-away countries and left some of those that are close to home to shift for themselves. The obvious has been too obvious and the will o' the wisp has been chased so far that the chaser, tired out in his quest after the brilliance of distance, has overlooked the lights shining at his very doorstep.

The first case in point is Latin America, and the first country of that great and beckoning domain is Mexico. That country has had little measure of attention from the automotive manufacturers of the United States, although it has been demonstrated as being a potentially large market for those companies which have made a real effort to capture any of its business. A quickening of interest in regard to Mexico has become noticeable during the last few weeks, as the exporters have seen the takings of cars and trucks drop lower and lower in the European countries.

Of course, almost every car made in the United States has been introduced into Mexico City and to some other parts of the country. But that is about all; they have been introduced only. If the exporter, taking time away from his work of chasing the business of Europe, happened to strike a good dealer, his cars found ready sale and good service in the capital city and in other parts of the provinces. But that point was up to the dealer, not the manufacturer. If the dealer happened to be a poor one—and it is surprising the number of such dealers whom enthusiastic travelers have corralled in their jaunts about the foreign countries—the car became immediately a "dead one." The manufacturer was too busy investigating France or England, for instance, to concern himself with the pushing of cars in Mexico City. It was too close to home and, anyhow, a branch in London or Paris sounded much bigger than one in Mexico City.

This is not destined to be an article giving facts and figures concerning the potential trade with Mexico or even to extoll its merits as an outlet for American automotive equipment. But it is an effort to call the attention of manufacturers to that prosperous and developing country, just as it is to call their attention to the markets that are south of Mexico and which stand out as the natural fields for American commerce.

Export executives have been prone to say that Mexico has been revolution-ridden or that there "isn't any money in the country," and thus to dismiss the subject with but little thought and most likely no study. The result has been that certain makes of European cars are still among the first four in actual numbers in Mexico City, and that some well-known makes of cars, the worth of which have been proven throughout the world, are scarcely known in that city and not at all in the provinces.

Why? The will o' the wisp shone too brightly farther away and Mexico was forgotten. The market was not de-

veloped, dealers were signed up without thought of the future, and service and repair parts were not furnished. Service and repairs have put several well-known American cars and trucks into the graveyard in Mexico. And, vice versa, service has lifted several American cars and trucks high in the import business as well as esteem of our southern neighbor.

These things would not have been possible, of course, in a buyers' market in which demand was below the supply, as it is now. Mexico and the other countries of Latin-America would have attracted the manufacturer of the United States and less of his sales ammunition would have been expended in the highly competitive and manufacturing countries of Europe.

Buenos Aires Exposition

PLANS are being completed rapidly for the exposition of United States products to be held at Buenos Aires in March, 1921. The importance and desirability of this showing has recently been the subject of special comment by the Chamber of Commerce of the United States in the Argentine Republic which, urging the showing of North American products, declares that the exposition will be the first of its kind in that it will be limited to the manufacturers of one country.

"It is new because it will be the first exposition in history," the Chamber says, "to show exclusively the products of one nation to the public of another nation. North Americans may enjoy whatever credit there may be in originating this idea (which is perhaps the first real novelty in expositions seen in centuries), but they are not likely long to enjoy the monopoly thereof. Competition for foreign trade is altogether too keen to permit the exclusive use by any one nation of a selling influence so simple, powerful and practical. It was inevitable that the idea would be adopted by other exporting nations. Two of them have already, since the announcement of the Buenos Aires exposition plan, issued prospectuses for exactly similar affairs at other strategic points."

The exposition will recommend itself readily to the American manufacturers of automotive equipment and it seems evident that many of them will be found represented in the thirty-six acre exposition ground. The showing of motor cars, as we think of it in the United States, where every city has its annual exhibit, has not taken hold

throughout Latin-America. Dealers are not organized into associations as they are here and the impulse to such showings should come from the manufacturers.

The same conditions apply also as to trucks and to a smaller degree to tractors. Several tractor shows, or contests, have been held recently throughout various parts of Brazil, the Argentine and Chile, and more of these will be held if the manufacturers get behind the idea through their foreign departments. But here the tractor comes under a different situation than does the motor car or truck. With these two, there has been no incentive to expositions, whereas the tractor fits in closely with the agricultural exhibitions that are an established custom throughout many of the Latin-American countries.

A Car in China

THE advent of an American passenger car, the name of which unfortunately was not given, in the interior of China was described by Vice Consul Richard R. Smith, of Nanking, China, in a recent communication to the Bureau of Foreign and Domestic Commerce. This car was driven on tour more than 500 miles and finally was sold at Hankow.

"The automobile was demonstrated chiefly to the local officials and native gentry, who were greatly interested in its operation and price and several sales were made," the Consul writes. "At Kaifengfu, the military governor of Honan not only opened negotiations for the purchase of a car but proposed the building of a road from the north gate of Kaifengfu to the Yellow River, a distance of about 15 miles, where a good cart road follows the river to Tsinanfu, the capital of Shantung. The governor proposes to establish a motor-bus service between the two provincial capitals.

"The representative who demonstrated this car expressed the belief that not only can passenger cars be operated at a profit in China but that motor trucks can successfully compete with native cars in carrying produce from the interior to the railway. Though the territory covered in the demonstration is not equipped with roads in the modern sense and though the surface of the ancient cart roads is very rough, the demonstration was convinced that the road beds were in fair condition and that not much work will be required to adjust these highways to motor car traffic."

Putting a Check on Pseudo Fuel Inventors

THE Empire Motor Fuels Committee of the (British) Imperial Motors Transport Council has been considering the abnormal and unhealthy activity shown by pseudo-inventors in respect of alcohol motor fuels and mixtures containing alcohol. A representative of the committee recently addressed the following question to the president of the Board of Trade: "If the Patent Office will pay special attention to the number of applications for letters patent in respect of admixtures of such bodies as alcohol, ether, kerosene, benzol and toluol as motor fuels, in which applications no element of novelty, discovery, or invention appears to be disclosed, and if he will give instructions to the Patent Office to be especially careful not to hamper or prejudice the production or utilization of new motor fuels by the creation of ground for litigation in respect of alleged master patents?"

In his reply, Sir Robert Horne said that full and proper consideration would be given to all applications for patents

in respect of inventions relating to new motor fuels before the patent was granted and that the Comptroller of the Patent Office in considering what was a proper subject of a patent was, of course, bound by the provisions of the Patents and Designs Act, in accordance with which he must act.

The Empire Motor Fuels Committee believes that great damage may be done to the prospect of early production and marketing of new motor fuels if disregard is shown by the Patent Office to the known miscibility, within various limits, of alcohol, benzol, gasoline and other hydrocarbons and carbohydrates, and the committee warns the public that any claims of master patents should be viewed with skepticism.

A FRANCO-BRITISH syndicate has acquired a large share interest in Galicia, Ltd., a company formed in Slovakia for the exploitation of Galician oil fields.

Survey Reveals Wages Lower Than Estimated by Current Opinion

A wage survey of the automobile industry made by the U. S. Bureau of Labor Statistics during early months of 1919 shows average wage to be 57 cents per hour worked. Only two other paid higher hourly wages and gave employment an average of 8 hours a day. Facts worth attention.

WAGE surveys are at best hard to make and difficult to keep up to date. The rapidly changing industrial conditions of the last few months have made the task more difficult still.

Such a survey, of course, cannot be made in a day, while considerable time is necessary to record, tabulate, and publish results. Nevertheless, the recently published wage figures for the automobile industry presented by the Bureau of Labor Statistics are of special interest from several angles.

This survey was made between Jan. 11, 1919, and April 26, 1919. It included 32 typical establishments—13 manufacturing passenger cars, 14 manufacturing commercial cars, and 5 manufacturing both types of vehicle. The plants investigated were located in seven different States and employed a total of 17,812 male workers and 622 female workers.

The hourly wage given in the figures is based upon the average earnings per hour worked. The automobile workers averaged 8.2 hours per day during the period covered by the survey, so that the hourly earnings given constitute a fair statement of the man's real earnings, assuming eight hours to constitute a normal working day.

Similar surveys were made for twenty-nine other industries, so that interesting comparisons can be made. The introduction to the printed report of these surveys defines the limits in this way: "All salaried official and clerical employees were omitted. Of the remaining employees, all were included except—

- (a) those whose pay was due wholly or in part to their performing a supervisory function;
- (b) those who, either because of their youth or inexperience or partial incapacity, were receiving a wage distinctly below the normal;
- (c) those who were performing functions so varied or poorly defined that they could not be classified;
- (d) those in occupations with so few employees that even a considerable number of establishments would not provide enough to make a fair showing.

"The figures given in the tables may be relied upon as giving hours actually worked and earnings actually received. . . .

"So large a number of employees is included in these summary tables that the figures given may safely be regarded as fairly typical of the country at the time the survey was made."

With these explanations in mind, the actual figures presented reveal certain facts somewhat different from those which have been assumed and eagerly quoted during the last four years by casual observers and enthusiastic journalists.

The average wage in the automobile industry during the period of the survey was 57.1 cents an hour on the basis of average earnings per hour worked. On this basis,

the automobile industry stands eighth in the list of industries. Five of those industries which record a higher average wage per hour, however, gave employment to the workmen less than 8 hours a day. Of those industries in which an average of 8 hours or more was worked daily, the automobile industry stands third. The two above it are:

1. Woman's Clothing	\$0.724	8.1 hours
2. Machine Shops (other than machine tools)599	8.2 hours

The casual visitor to automobile plants during the last few years was likely to get the impression that the average wage for everyone above the class of laborer was between 80 cents and \$1 an hour. A detailed study of the survey does not bear out that impression.

Of the entire number of workmen included in the survey of the automobile industry 7.3 per cent received 80 cents an hour or more.

17.3 per cent received more than 70 cents and less than 80 cents an hour.

33.4 per cent received less than 50 cents an hour.

So much for the general averages in which all trades and classes of labor are bulked together. Of the 38 trades listed for male workers in the automobile industry, the following received in actual earnings more than 70 cents an hour:

1. Back Hangers and Trimmers (Trim Shop)	74.3 cents
2. Rough Stuff and Varnish Rubbers (Paint Shop)	72.0 cents
3. Stripers and Letterers (Paint Shop)...	71.6 cents
4. Toolmakers and Diemakers	75.4 cents
5. Top Builders (Trim Shop).....	73.4 cents

The highest paid of this group are the toolmakers, workers in a highly skilled trade, as might be expected. The other workers in this group are more or less skilled; they have in common, however, one characteristic. That is the trim shop and paint shop men are probably more highly and actively organized in the automobile industry than any other trade group.

The lowest paid groups were, as would be expected, the laborers with 46 cents an hour, and the blacksmith's helpers with a similar rate. Next came the packers and furnace helpers, who drew 48 cents an hour.

It should be noted that in computing all these rates, actual earnings have been the basis of computation; that is, bonuses, premiums, etc., are all included.

The foregoing figures apply exclusively to male workers. Where comparisons can be made, the statistics show women workers to receive much less wages per hour than do the men. This would indicate different things, depending upon whether the work was piece work or day work in a particular plant. In the former case, it would mean

that the women could not produce as rapidly as the men, assuming that the piece-rates were the same for each sex. In the second case, it would indicate that women were paid less wages than men for similar work.

The detailed figures of the thirty surveys are to be found in Bulletin No. 265 of the Bureau of Labor Statistics. A number of industries closely allied to the automobile industry were included in the survey. Among these are:

Coal	Lumber
Foundries	Machinery
Glass	Machine Tools
Iron and Steel	Rubber
Leather	

While it is true that the figures presented in this survey are somewhat out of date at present, they are of interest as being the most complete data available. The fallacy of one common tendency is revealed, however; that is the tendency among some persons to generalize as a result of a specific incident or experience.

For example, many people during the last few years have repeatedly bemoaned the high wages which workmen were getting, dilated upon the silk shirts and automobiles the mechanics have obtained, and said that "common laborers are getting over a dollar an hour"—and on that last statement they have based all their industrial opinions.

Many times within the last two years, manufacturers when asked, "What does the average machine operator in your plant make?" have answered:

"Oh, 80 cents to \$1 an hour. Why one man here last week made over \$200." And the questioner has gone away with an entirely false impression of the average wages of the average workman. It does not do to hear that one workman made \$18 one day and then consider denunciation of high wages justified on the basis of that man's earnings. It does not do because when accurate facts and statistics finally appear, the reaction cannot be anything but unfavorable.

Within the last eight months casual inquiries have been made in a large number of automotive plants as to what the average workman was earning. Taking fully into consideration the wage advances of the early part of 1920 over those of the period of this survey, no conclusion can be reached but that the figures presented in this government survey are incorrect or that the answers to the queries cited were not accurate.

If the figures are not correct, automobile manufacturers would do well to submit proof to the contrary, for it is from these government statistics that labor unionists, journalists, and others who mold public and labor opinion will take their facts.

New Problems Regarding New Americans

ASSIMILATING the foreigners who come to our country has always been a pressing problem; a problem which has never been adequately met. But new problems have arisen lately which make even more complex the task before America. The vital importance of the proper accomplishment of this task to the manufacturer is pointed out in a short article by Francis A. Kellor, of the Inter-Racial Council, who has just returned from an industrial survey of conditions in Europe. A portion of Mr. Kellor's statement is as follows:

"The time has passed when the American employer could count upon an unlimited supply of labor from abroad. Emigration from the countries of Europe will be strictly regulated by the governments in the near future, and is already being directed in some of the Old World nations, which have begun to realize the value of their workers. Instead of permitting their men and women to leave at will and select their own destinations, as in our port, emigration will be curtailed by many governments to the extent deemed expedient for their own interests. Instead of the emigrant selecting his own future home, the governments will advise him where to go, and in some cases will retain him as a citizen, with voting rights, even while living abroad. At present the Lithuanians in America have three deputies to represent them at the next meeting of the Constituent Assembly of Lithuania, while Italy has under consideration a plan to give its nationals throughout the world elective representation in its home government.

"This means that the immigrants who do come here will have less tendency to make America their permanent home and become citizens, hence we will have to make greater efforts to assimilate them than we have done in the past.

"Some of the foreign nations are planning to do the things which America should have done long ago; to protect immigrants from fraud, to establish official information bureaus, to take care of their savings through branch banks and generally to look after their welfare.

"The most powerful inducement to foreigners to remain in this country is, of course, just and humane treatment, with no discrimination in wages, housing, living and working conditions between them and the native born.

Efforts should be made to establish closer relations with the foreign born workers. If they have legitimate causes for discontent, the grievances should be understood and removed. The same spirit of co-operation that is being secured through enlightened employers and their English-speaking workers should be developed in relation to the foreign born laborers.

"This is not 'coddling,' not philanthropy, but labor conservation. As in the early days of America, we were wasteful of our resources, coal and oil, natural gas and timber, until we saw the results of extravagance, so at present we are as wasteful of our man-power, as if the supply were inexhaustible.

"The course of action for the employer is, therefore, first, to conserve labor as carefully as he conserves his raw material; second, to regard immigration problems with the same interest that he gives to international commerce, realizing that America is no longer isolated and that what happens in the Old World to-day will be reflected in his own business to-morrow."

A MODIFIED form of official indicator for studying pressure phenomena in high speed internal combustion engines has been constructed by Prof. F. W. Bustall of Birmingham University. A very intense, thin beam of light is projected on to a plane mirror; the mirror itself is fastened to the end of a steel spring, and the motion of this spring is proportional to the pressure in the engine cylinder. The ray of light reflected from the mirror is caused to impinge on a second mirror which is driven from the crankshaft so that the ray of light has a double motion. The results are recorded on a photographic plate, and in this manner it is possible to take the photograph of the complete cycle of operations in less than one-hundredth part of a second. To secure accuracy, a great many points have to be attended to, as the movement of the springs is so small that a very small error or lost motion completely destroys the accuracy of the results. These sources of error are said to have been overcome to such an extent that the errors at no point of the diagram exceed $\frac{1}{2}$ per cent.

Motorcycle Industry Well Started on the Up-grade

Both commercially and socially the motorcycle industry may be said to be on the up-grade. Intensive sales effort and definite attempts to give the motorcycle a more favorable standing in the community were the points emphasized at the dealer convention of a large manufacturer.

By Norman G. Shidle

WHILE the motorcycle industry has been affected by the present business slump along with others, it has not been slowed down to any appreciable extent. Dealers are planning intensive sales promotion efforts for the winter, and are firm in believing that they will cash in on these efforts in a big way as the spring of 1921 comes around.

Definite efforts are under way to raise the motorcycle in the estimation of the general public; to bring merchandising methods to a higher plane; to establish in the minds of every class of people the thrill and joy of the motorcycle as a sport and its usefulness as a utility.

These were the chief ideas stressed at the dealer convention of the Harley-Davidson Motor Co. held in Milwaukee Nov. 4, 5 and 6. The tendencies of the motorcycle industry as expressed at this convention assume a larger importance than would a similar convention in the automobile field. This is true because there are in this country only a few motorcycle manufacturers, and only three of any considerable size. Consequently the tendencies indicated by a dealer convention of one of these three assume considerable importance in an analysis of the present status and future possibilities of the motorcycle in this country.

Many popular objections and criticisms of the motorcycle are current in every community. With these criticisms the industry has had to contend, but there was one striking fact about this convention.

Every one of the current objections to the motorcycle was thoroughly discussed. The dirty driver, the noisy cut-out, the accident features, the unfavorable publicity obtained as a result of accidents, motorcycling as a "rough-neck" sport—all of the unfavorable criticisms are thoroughly recognized by the men behind the motorcycle industry, and intelligent effort is being expended in trying to eliminate the objectionable features, combat such criticism as is unjust, and bring the motorcycle into good repute among those people who, up to the present, have regarded it with aversion. Not only are these problems being studied, but practical means for correcting them are being worked out.

The motorcycle industry is not going backward; it is very definitely on the up-grade. And as far as the present slump is concerned, it is interesting to note that every indication points to the fact that it has not been nearly as hard hit as its big brother, the automobile industry.

For instance, with a few notable exceptions the automobile plants of this country have all made reductions in their working forces during the last few months, while some plants have temporarily closed down.

The Harley-Davidson plant has cut its working hours from 10 to 8 hours a day, but has not reduced its working force. The production has been decreased in proportion. As regards plans for 1921, production for that year had been planned for 30,000 motorcycles. That schedule has been reduced to 24,000 in light of present conditions, but Walter Davidson, president of the company, is authority for the statement that there is a good chance that that schedule will later be revised upward.

Throughout the convention optimism characterized every speech. But the necessity for more than "talking optimism" is recognized. In his address, opening the business session of the gathering, Davidson told the dealers that while there was every reason for optimism a great deal of sales work would be necessary. He advised the employment of intensive sales and advertising efforts, and said that the overhead costs for sales and advertising would increase during the coming year.

There was no hint that sales promotion efforts should be curtailed in order to save money. On the contrary, great emphasis was laid upon the necessity for advertising, direct mail campaigns and intensive sales efforts as the only sure means of keeping sales up to normal. The idea that "every difficulty is a challenge" predominated.

The motorcycle is being marketed in two ways:

1. As a sport.
2. As a utility.

The sporting angle plays by far the most important part, and it is from this point of view that the most extensive efforts are being made. One man, long in the motorcycle business, stated that 80 per cent of motorcycle sales were for sporting or recreation purposes, and that he believed the greatest possibilities for future development lay along those lines.

With this idea in mind, many dealers are making an effort to place motorcycling favorably before the public as a clean, manly and interesting sport. Some of the principal methods of accomplishing this purpose are as follows:

1. Keep demonstrating machines "spick and span."
2. Keep salesmen cleanly and attractively attired when demonstrating.
3. Try to "sell" to drivers the idea of cleanliness and neatness in attire and of refraining from unnecessary noise in driving.
4. Organize week-end trips, "gypsy" tours, small clubs, etc. Through this work, organized and participated in by the dealer, the best ideals of motorcycling can be instilled into the riders in any particular territory.

5. Keep salesrooms and repair shops clean and in good order; keep windows clean and attractively decorated.
6. Render courteous service to customers.
7. Attempt in every way, through publicity and actual riding, to place the motorcycle on a higher plane than it has heretofore occupied in the minds of the public.

A noticeable feature of this convention was the general sentiment that one of the big tasks before everyone in the industry was:

1. To so conduct himself as a rider that he might be a good example to those outside the industry.
2. To help bring the motorcycle in general to more favorable attention without regard to the merits of any particular machine.

There might seem to be one objection to the emphasizing of the sport side of the motorcycle and the subordination of the utility angle. That is, in times of credit stringency or other emergency when a line is likely to be drawn between essentials and non-essentials, **the motorcycle might feel the ill-effects more rapidly and meet with more difficulty than if it had been presented more emphatically as a utility product.**

When this possible objection was brought to the attention of Davidson, he stated that when money was tight the sportsman was likely to be the only man who really had any money, and that he would still spend it to obtain his sport. He believes that something like that situation obtains to-day, when the drop in motorcycle buying is not so great as in some other lines of business. While many motorcycles are sold on time payments, Davidson said that the manufacturer had always urged the dealer to be very strict in such cases to obtain a large payment down; that under present conditions, for instance, practically one-half the entire selling price was being exacted as an initial payment, and that the men who went in for sport were those who had more ready money than any other class.

The fact that emphasis is being laid upon the sport side of the motorcycle, however, does not mean that its utility value is to be neglected. Many sales are possible for utility purposes, and some dealers have been particularly successful in developing this phase of sales effort.

In defining the possible field for the motorcycle, E. J. Mueller, sales manager of the Harley-Davidson organization, stated that analysis showed that one man in every 5000 was a motorcycle prospect.

The value and necessity of advertising constantly and in a proper manner were emphasized throughout the convention. As one man tersely said, "Doing business without advertising is like winking at a girl in the dark; you know what you are doing, but she doesn't."

In discussing the effectiveness of various means of advertising, the newspaper was, of course, accorded a prominent place. The direct mail campaign, however, came in for extensive discussion and will probably play a larger and more important part in future motorcycle sales efforts. Some attempt has been made at street car advertising, but had not met with a very enthusiastic reception from the dealers.

In connection with advertising, the matter of racing was discussed. While such publicity was claimed to have an enormous value, its cost was shown to be very heavy.

It seems possible that more attention has been given to the racing features of motorcycling than the best sound and permanent development of the industry might warrant. Racing is an expensive form of advertising

and is very effective with a certain class of buyers—chiefly those who have already been buyers rather than those classes to whom the motorcycle has not yet appealed. The young man or boy may be strongly influenced to buy a machine because the manufacturer of that machine won a national championship recently. But the higher type of buyer knows that the machine he is buying is nothing like the machine which won that race, and that there is little logical connection between them, except that both were made by the same manufacturer.

It would seem that there is in this country a great potential group of motorcycle buyers who would enjoy the pleasure and outdoor features of the sport minus the actual thrills. Certainly the racing angle of motorcycle publicity is developed far more extensively than some other angles that are, perhaps, of equal importance.

The dealers themselves, for instance, are usually riders as well and are sometimes so desirous of reading the racing news and gossip of their trade papers that they find little time to peruse the articles which concern adequate accounting methods, effective salesmanship and service, and other practical business helps which would better aid them to sell machines than the races. This is the opinion of several men long connected with the motorcycle industry who are not directly concerned in the manufacture or sales of the product.

The status of the motorcycle industry so far as financial interests are concerned seems favorable, according to the statements of two prominent Western bankers who addressed the convention. J. H. Puelicher, president of the Marshall & Ilsley Bank of Milwaukee, stated that the motorcycle industry was performing a real service to mankind and for that reason would survive and grow.

In regard to the general financial situation, Puelicher said that "every manufacturer wants everyone else's price to come down, but wants his to remain where it is." He said also that those who took advantage of the war situation are those who are crying the loudest against price reduction. He sees in the present situation a healthy return to normal—a normal deflation which has no horrors for the man who has an honest product to sell at an honest price.

In a consideration of the possibilities for the future development of the motorcycle in this country, the popularity of that vehicle in England is certain to enter the discussion. In England there are almost as many motorcycles as there are automobiles; that is, England has many more motorcycles in proportion to its population than has the United States. The questions arise, can the motorcycle in this country ever attain to a proportionate development and use? Why does England have so many more motorcycles per person than does this country?

This phase of the motorcycle question was put before several men prominent in the industry, among them Walter Davidson and W. H. Parsons, editor of *Motorcycle and Bicycle Illustrated*. The reasons for the greater proportion of motorcycles in England was attributed to these causes:

1. England is more of a "sporting nation" than is the United States. Englishmen devote more time to sport and less to business. There is this definite psychological reason.
2. It costs more to own and operate a motorcycle in England; consequently it has appealed to a higher class of people. Men who might own a Dodge or Ford in this country pay the same price and gain the same prestige in England by riding a motorcycle. These men might own small cars in this country, but in England cannot afford one.
3. England has better roads.

It is interesting to note, however, that anyone of the three large motorcycle manufacturers in this country manufacture more motorcycles per year than do all the manufacturers in the rest of the world outside of the United States. This is true despite the fact that there are about 150 manufacturers in England alone.

The American motorcycle, moreover, is acknowledged by engineering experts to be far ahead of foreign models as to design, construction, workmanship and service.

The last registration figures compiled by AUTOMOTIVE INDUSTRIES showed that there has been a considerable dropping off in motorcycle registration during the last year. This has led to the conclusion in some quarters that the motorcycle industry was on the wane. This is not the case, however. The drop in total registration is readily explained.

There were formerly some fourteen motorcycle manufacturers in the United States. Now there are six. Many persons were still riding these old machines, of course, long after the manufacturers had gone out of business. Gradually these machines wore out and went into the discard.

On the other hand, those manufacturers still in business have been utterly unable to meet the demands for their product during the last few years, consequently they have not yet been able to re-sell the former users

of these old machines, since there have not been produced nearly enough machines to meet the new demands. As a result, all those manufacturers still in business have greatly increased their production and sales each year, even though registration figures have fallen off to some extent.

And it is just because of this situation, according to Davidson, that the prospects for the motorcycle industry are exceptionally bright even at the present time of business depression. There is a potential demand for motorcycles that has not yet been filled; the market is not anywhere near even temporary saturation.

It may safely be said that the motorcycle industry is rapidly assuming a higher tone than it has ever before had. The dealers of the industry are definitely changing caste; the clean-cut, progressive business type is rapidly replacing the old-timer, who was long on mechanical ability and grease but short on courtesy and progressive methods.

This change is becoming more rapid each month, and as the change is completed new spheres of influence and new fields for sales obviously open themselves to this industry, for which every indication points to a gradually growing success and a steadily rising standard of performance and activity.

Non-Inflammable Baking Japan

BAKING japan, as ordinarily used in manufacturing, consists of two elements, the base and the solvent. The base is usually some variety of asphalt, combined with linseed, or some similar oil, the whole making a hard rubbery appearing substance. This must be liquefied for use, and the common practice is to dissolve it in naphtha, or kerosene. The process of japanning various metal articles consists in dipping them in the liquid japan and then baking them in an oven.

Owing to the volatile and inflammable type of the solvents used, this baking process is somewhat hazardous. After several bakings have been consummated the atmosphere in the oven resembles that of the inside of a gasoline engine cylinder, only needing a spark, or even excessively high temperature to cause an explosion of great force. Occasionally the results of these ovens blowing up have been disastrous, due to losses from fires caused by the explosion.

This risk has been great enough to cause some of our large municipalities to consider requiring a manufacturer to not only isolate his oven buildings, but to provide further protection in the form of a fire wall. It also seemed possible that the insurance companies might become interested to the extent of causing increased expenditures on the part of manufacturers who are large users of japan.

The manufacturers consequently became interested in the possibility of developing a type of japan which has a non-combustible solvent. The Research Laboratory of the General Electric Co. was requested to try and evolve such a product and a course of research on their part resulted in the development, by them, of a variety of japan which eliminated the necessity of a solvent possessed of the destructive propensities of the conventional kinds.

WATER JAPAN—AN EMULSION

This water japan, as it is called, is an emulsion of the asphalt oil base with water. By this is meant that infinitesimal particles of the base are held in suspension in the water, instead of being dissolved in it. It was

found that this japan had no tendency to settle out, even after months of storage, and that, owing to its being "suspended" in water, losses by evaporation were practically negligible.

The methods of applying the japan are two in number, the electric dip, and the hot dip. The former is appropriate for small articles and consists in placing them, charged positively, in a negatively charged iron tank of japan. The result is that an even, smooth coating of japan is deposited on the articles in question, and, since the japan is deposited free from solvent, there is no resultant drip when the lot is conveyed to the baking ovens.

The second method, or the hot dip, which is applicable to large pieces of metal, was found more or less by chance. It had been the custom in the laboratory to pre-heat the metal before dipping, in order to free it from dirt and grease. This pre-heating evidently had the same effect of causing the japan to form a deposit on the metal as giving it a positive electrical charge. A third method is also sometimes used, which is a combination of the two already mentioned. That is to say, the metal is both heated and positively charged.

The result has been that a variety of japan has been evolved that gives exactly the same effects as the solvent variety. It is cleaner to handle, owing to the absence of drip, and eliminates the danger from explosions and disastrous fires that were such an unpleasant feature of the old form of this highly necessary compound.

THROUGHOUT England there has been a remarkable growth in the number of technical students. The increase in the number of students at Birmingham University in electrical and mechanical engineering, in coal mining and petroleum, and in metallurgy, chemistry, and physics, has been phenomenal; and for physics and chemistry, ten Army huts, 70 x 30 ft., have been erected as temporary laboratories. The Senate has launched an appeal to the Government and the Midland manufacturers for half a million pounds.



Crankshafts for Eight-Cylinder-in-Line Engines

Editor AUTOMOTIVE INDUSTRIES:

I have read with interest your editorial in a recent issue under the heading "Eight-Cylinder-in-Line Engines." I agree with you that this type of engine for certain classes of cars may get "en vogue." My reason for writing you, however, is that in discussing the various possible and desirable types of crankshafts you have in my opinion omitted the best type. This crank is built up from two standard four-cylinder shafts in such a way that one of these is used for the four center cylinders. The other four-cylinder shaft is parted in the center and one-half of it is placed in front of the other four-cylinder shaft, twisted 90 deg. center to center from it, the other half being placed in the same plane symmetrically at the rear end. This type of shaft, of course, gives complete balance of all inertia forces, there being neither a free vertical force nor a rocking couple. This shaft is as easy to drop-forged as a six-cylinder shaft, and the two 90 deg. twists necessary should involve no difficulty. Eight different firing orders are possible with this shaft between the limits 1-4-2-3-8-5-7-6 and 1-5-2-6-8-4-7-3, according to the designer's wish to distribute the impulses. The eight-cylinder-in-line engine has several advantages over the other possible engine arrangements, presenting as good or better torque as the eight and twelve cylinder V types. It is much more get-at-able, it is cheaper to make and it is narrower and therefore easier to accommodate under the present style narrow hood. As examples of modern European engines may be mentioned the Isotta and the Leyland.

Uppsala, Sweden.

JAN G. SMITH, M. E.

Lack of a Specially Designed Motor Bus Chassis

Editor AUTOMOTIVE INDUSTRIES:

MOTOR buses are making wonderful strides all over the country, and there is a large field open for the enterprising man who will run them on business lines. This is especially true in this vicinity (Watertown, N. Y.), where a number of successful lines radiate from the city.

Most of the buses are home-made affairs, crude and clumsy to ride in. Some are cutover touring cars, some are trucks meant to carry freight, and all are far from satisfactory. There does not seem to be any effort by car makers to touch this field. A bus is a cross between a truck and a touring car. It wants some of the speed of a touring car and the full electrical equipment, but it also needs the sturdiness and chassis lines of a truck.

The average seating capacity of a bus for suburban work is 20 passengers, with an average run of 25 miles for successful operation. This is the experience of those engaged in the business in cities with a population around 50,000. Buses were operated profitably at 2 cents a mile per passenger in this vicinity for some time before the high prices set in, but 3 cents a mile is now required to make the business profitable, unless you can be assured of

a large volume of business at all times, when the lower rate will be good. Most motor bus men make the mistake of charging high fares and never get a steady trade. The people who travel in buses are not those who can afford automobiles, and unless the fare is within their reach, they will not travel often. The result is, the bus is being operated with a number of vacant seats that bring no income.

If car makers will build a chassis along the following lines and specifications, a number can be sold in this vicinity: Wheelbase, 160 or 170 in. Tires, 36x6 in. all around. (This size tire is not needed in front, but with the same size tires all around a driver needs only one spare; besides, a half worn out rear can be put in front.) A 1 1/2 ton truck frame and spring suspension. Worm drive with 5 1/2 or 6 to 1 gear ratio. Dry disk clutch. Full floating rear axle. Engine, 6 cylinder developing 40-50 hp. Must have very liberal bearings for long wear and a simple but efficient oiling system. Self starting and charging system in separate units that can be readily replaced. A strong radiator that doesn't look like an iron fence. All material to be the best possible.

A good substantial body weighs about 1200 lb. Twenty people, averaging 150 lb., weigh 3000 lb., making a total load of 4200 lb., or 5000 lb. to make a liberal allowance of passengers and body.

The writer has made a diligent search for such a type of chassis but has been unable to find anything that just suits. The nearest thing that has been found is the ambulance chassis which a few makers manufactured but have now discontinued. This proposition for the manufacturer is to build chassis only. Bodies can be built in almost any city to suit requirements and designs, although one standard type and design bus would help sales where the customer wants a ready-made outfit.

Watertown, N. Y.

A. F. WARNER.

Reaming Crankshaft and Camshaft Bearings

REFERRING to a recent article in these columns in which mention of their reamers was made, the Kelly Reamer Co. informs us that in order to use these tools for reaming the crankshaft and camshaft bearings of engines, it is not necessary that the bearings be stepped. Perhaps 90 per cent of their customers among motor manufacturers use the Kelly reamers on crankcases with all bearings of one kind of the same diameter. It is advantageous, however, to step the crankshaft and camshaft bearings in opposite directions, as by doing so the necessity for changing cutters is eliminated, whereby production can be increased about 30 per cent.

As a somewhat different impression was conveyed by the article referred to, we are glad to set the matter right.

THE American Society of Agricultural Engineers announces that the transactions of the Society for the past year have been compiled in book form and are now on sale to non-members at \$1 a copy. The volume includes the chief papers read during the year. The secretary of the Society can be addressed at Ames, Iowa.

The Neglected Element in Labor Relations—The Foreman

In modern industrial organizations the contact between the worker and the employer must, of necessity, be that existing between the shop or office supervisor, best known as the foreman. If he is not informed as to company policy, can he be blamed for misinformation handed on to the workers?

By Harry Tipper

THE necessity for considering the general attitude of labor and experiments which have been made in connection with the readjustment of industrial organization in developing closer relations between employer and employee, has made it difficult to differentiate between employees and to give the attention to the supervisory employees which they require.

Of all the supervisors in the line of management, those who are in direct charge of small groups of workers are of the utmost importance, whether they be sub-foremen or foremen in the shop, chief clerks, inspectors in charge of a drafting room or supervising sections of an accounting department. These employees are the ones who are intimately in touch with the workers in the ranks and who by the very character of their contact are more influential not only in the quality of the work which is performed, but in the approach of the worker to his work and the attitude of mind with respect to it.

For the most part, these men are not only more intimate with the workers while they are at work, but they are sufficiently near the same type of social existence, the same amusements, the same reading and the same general understanding to be thoroughly sympathetic with those over whom they have supervisory charge.

This is not affected by the fact that some of them are drivers instead of leaders, and that many of them are inclined to feel the honor of their responsibility in their attitude toward their subordinates. These are the men who must face a thousand and one trifling and intimate problems, which affect the final result in the production or the other elements which enter into the complete business of manufacturing. They cannot settle any of the broad plans, change any of the systems, rearrange any of the methods, but they must solve all the little difficulties which enter into the operations of these systems and methods and the development of the plan.

For some reason in the general tendency to develop better relations with the workers, these supervisory employees—through whose hands filter all the instructions of the management, all the final operations of the systems and methods—have been neglected to some extent and their power as a force for better relations has not been used or studied to any very great degree.

In very few factories are the foremen thoroughly conversant with the reasons for the various systems by which they must work, the methods of arranging the work and the other general plans to which they must harness their group. As to the knowledge of the expense

of a business, the proportionate costs and profits, they are almost as ignorant as the subordinates by whom they are consulted on these matters and to whom they must offer their instructions and their advice.

The purpose of management, the effects of idleness of machines and men, the cause of spoiled work, the reason for inspection, orders of work and innumerable forms, the value of other departments of the business are rarely understood and little effort has been made to see that they can explain such matters properly and aid in the development of the right kind of information among the workers.

The responsibilities which they have result in a loyalty to their work and organization that has made them more permanent and more faithful in the discharge of their duties. Perhaps this is one of the reasons for the neglect of their possibilities by the average manufacturer.

There are almost a million of these supervisory employees directing the energies of small groups of workers of all kinds in the United States to-day, whose influence with these groups is very definite and very considerable. If these men all understood more definitely what industrial organization means and the value and necessity of the various departments of the business, they would form an educational force capable of affecting the attitude of the worker to a degree altogether impossible otherwise.

They are acquainted with John and Bill in an intimate way which is impossible for the general manager to develop, no matter how he may desire to do so. Even the representatives of the workers on the works committee will not carry all the influence that these supervisors can wield. They have a lot of problems to meet, and even the problems can be handled more effectively if they have an opportunity to discuss them, or if they are given a full understanding of the systems with which they work.

In some factories, schools have been started for the training of foremen along these lines, and in one or two of the larger manufacturing establishments, meetings of foremen are held frequently to discuss the problems which they are to overcome.

These methods have been of value wherever they have been tried out, but they have not gone sufficiently far in considered the other supervisory employees such as head clerks, and the supervisors in departments of the factory not immediately in the shop and the production work. Furthermore, they have not taken up, sufficiently, the elements of organization and the reason why organization has developed along given lines.

It will be interesting to any manufacturer who has not tried it, to find out what these employees know about the relation of their own department to the other departments of the company. The elements which enter into the cost of their departments and the value of the different branches of organization which are considered necessary by the company to effectuate their total business.

It must be remembered that these men have been chosen from the ranks as a rule for their superior skill in their work, and for the human qualities which indicate that they would be able to handle a small group of other men.

Neither their work nor their outside education has given them a decent understanding of the relation between different branches of the organization nor the reason for a good many of the methods. They cannot be expected to acquire this information outside of the industrial establishment, and up to the present their opportunities for acquiring it inside have been very limited.

Such a supervisor, filled with the misinformation which can be acquired very readily from his ordinary sources or without the proper information, can do much to nullify any work which is attempted by the general management in the bettering of industrial relations—unless that work has had for one of its first objects the education of the foremen along the same lines.

In many lines of endeavor, the workman believes that it is more important for him to work under a square foreman than it is for him to know anything about the policies of the company.

He is more anxious to know about the foreman than he is about anything else but wages. The same thing is true of the clerk who must work under his supervisor and of all employees of the ranks. The policies of the company, the ideals of the company and the justice of their actions, are no greater than the understanding of the supervisor, the character of his ideals and the visible value of his actions from a human standpoint. Leadership in the high places is of little value, unless the un-

derstanding extends through to the smallest leader of the establishment.

In one establishment with which the writer was acquainted there was continual trouble with one section of the accounting department. The turnover of employees was much greater than it ought to be and the co-operation much less. It was not until the matter became sufficiently notorious that an investigation showed the chief clerk of that department to be at fault because of his attitude to his subordinates.

A change of foremen in one shop so affected the work which had been accomplished by the shop committee in the previous year that it was nearly two years before the effect of that difficulty could be removed. In neither of these cases were the supervisors entirely defective in their capacity. In both cases they knew the work very thoroughly and were not without some elements of the quality of leadership.

Both of them had served under supervisors of the old type, neither of them had any education in the relations between supervisor and men and the relations between different departments, so that they were unable to see the effects of their own mistakes and in fact did not vision them as mistakes at all.

With so many supervisors required in industry, it is obvious that they cannot be very different from the subordinates over whom they have charge, in education, in their knowledge of organization and capacity to understand the industrial relations between departments.

It is obvious also that the contact between their subordinates and themselves is intimate and of great importance. There is no present probability of any of the work of their education being undertaken by the public authorities, and it must be done either by industry itself or through the co-operation of industry. In any case, the improved efficiency of production requires the careful education of all such supervisors as to the organization with which they are working, the relation of the departments in such an organization, the systems and methods and the general causes.

The Strength of Wood in Different Directions Relative to the Grain

In his presidential address to the British Association for the Advancement of Science, Prof. C. F. Jenkin called attention to the fact that wood is anisotropic and that its grain may be used to locate three principal axes—along the grain, radially across the grain, and tangentially across the grain. It is curious that there do not appear to be generally recognized terms for these three fundamental directions. A very few tests are sufficient to show that its strength is enormously greater along the grain than across it. How, then, is an engineer to calculate the strength of a wooden member? There is no theory, in a form available for the engineer, by which the strength of members made of an anisotropic material can be calculated.

Suppose a wooden tie or strut is cut from the tree obliquely so that the grain does not lie parallel to its length. In practice it is never possible to insure that the grain is accurately parallel to the length of the member, and often the deviation is considerable. How much is the member weakened? This comparatively simple problem has been of immense importance in aeroplane construction, and, thanks to the researches made during the war, can be answered. The solution has thrown a

flood of light on many failures which before were obscure. If the tensile strengths of a piece of timber are, say, 18,000 lb. per square inch along the grain and 800 lb. per square inch across it (radially or tangentially) and the shear strength is 900 lb. per square inch along the grain—these figures correspond roughly with the strengths of silver spruce—then if a tensile stress be applied at any angle to the grain the components of that stress in the principal directions must not exceed the above strengths, or failure will occur. Thus we can draw curves limiting the stress at any angle to the grain, and similar curves may be drawn for compression stresses. These theoretical curves have been checked experimentally, and the results of the tests confirm them closely, except in one particular. The strengths at small inclination to the grain fall even faster than the theoretical curves would lead us to expect. The rapid drop in strength for small deviations is striking.

Similar curves have been prepared for tensile and compressive stresses inclined in each of the three principal planes for spruce, ash, walnut and mahogany, so that the strengths of these timbers to resist forces in any direction can now be estimated reasonably accurately.

AUTOMOTIVE INDUSTRIES

AUTOMOBILE

PUBLISHED WEEKLY
Copyright 1920 by The Class Journal Co.

Vol. XLIII

Thursday, November 11, 1920

No. 20

THE CLASS JOURNAL COMPANY

Horace M. Swetland, President
W. I. Ralph, Vice-President
A. B. Swetland, General Manager
U. P. C. Building, 239 West 39th Street, New York City

BUSINESS DEPARTMENT
Harry Tipper, Manager

EDITORIAL
David Beecroft, Directing Editor
Ray W. Sherman, Executive Editor
Clyde Jennings, Managing Editor
P. M. Heldt

DETROIT OFFICE
J. Edward Schipper

WASHINGTON OFFICE
816 Fifteenth St., N. W.

BRANCH OFFICES
Chicago—Mallers Bldg., 39 East Madison St., Phone Randolph 6960
Detroit—95 Fort Street, West, Phone Main 1351
Cleveland—Guardian Bldg., Phone Main 1142
Philadelphia—Widener Bldg., Phone Locust 342

Cable Address Autoland, New York
Long Distance Telephone 8760 Bryan, New York

United States and Mexico One Year, \$3.00
Extra postage west of the Mississippi River on account of Zone Postage Law, 0.50
Canada One Year, 5.00
Foreign Countries One Year, 6.00

To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order or Register your letter.

Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; W. H. Taylor, Treasurer; A. C. Pearson, Secretary.

Entered as second-class matter Jan. 2, 1903, at the post-office at New York, New York, under the Act of March 3, 1879.

Member of Associated Business Papers, Inc.

Member of the Audit Bureau of Circulations.

Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907, and The Horseless Age (semi-monthly) May, 1918.

Business and Government

IN all of the business conventions the writer has attended during the past few months there has been a very strong urge that all business men interest themselves more intimately in the affairs of government. The especial reason for this urge has been the more than apparent need for a revision of taxes.

In a recent address before the National Trade Association Secretaries, Alfred Reeves of the National Automobile Chamber of Commerce, spoke directly upon government and business. He said that after many investigations he had become convinced that the legislators and government department heads were making an honest effort to treat business fairly, to meet as intelligently as possible the problems presented, but that they lack the intimate knowledge of the several industries.

This is not surprising in the least. A man must be in and of an industry to know the intricacies of its problems. So we would suggest to all men in our

new industry that they offer their services, through a proper representative, in all matters of government. This plan should be vastly superior to waiting until a wrong action is started and then objecting. Let us be constructive and "bore from within" at all opportunities. It will be necessary at all times for the representatives of the industry to advise fairly, if they expect fair treatment in return.

Trade Information

QUESTION as to the legality of the interchange of information concerning prices, markets, production and other items of trade association activities will be definitely settled when the Supreme Court of the United States hands down a decision in the so-called Open Competition Plan involved in the appeal of the American Column and Lumber Company and other defendants mentioned in the injunction granted by the District Court of Western Tennessee on the ground that these members of the American Hardwood Association were engaged in a conspiracy to enhance prices in violation of the Sherman Anti-trust Act. The argument was heard recently and a decision is expected in January or February.

Inasmuch as a large share of association work consists of exchange of information, the Court's opinion in this case will have a far-reaching effect on all lines of industry. The injunction of the lower court restrained the members of the Open Competition Plan from interchanging information through the medium of market letters, discussions, and predictions concerning stocks, production and prices. The Government argued that no one thing in the plan was by itself unlawful but that the intent and result of the whole arrangement constituted a restraint of trade.

Judging from the inquiries of Justices McReynolds and Brandeis, the court was concerned solely with the question of intention and effect and whether or not the collective activities of the hardwood manufacturers participating in the plan were sufficient to eliminate or control competition. Justice Brandeis inquired if it was the position of the Government to oppose trade association activities through insistence that operations of dealers and manufacturers must be carried on without co-operation, and therefore, in ignorance of market conditions. The Assistant to the Attorney General, Mitchell, replied that the Department of Justice only moved against such activities when they could be condemned as suppression of competitive influences.

It is significant to note in this connection the comment of Justice McReynolds as to the legality of dissemination of trade information. "I am with you in the abstract proposition that the exchange of information is in itself lawful," he commented. The appellants contended that nowhere had the Government furnished evidence to show that there was an agreement or understanding between parties concerning the maintenance of prices. The Government claimed the slogan, "Co-operation, not competition, is the life of trade," indicated the purpose of the plan was to replace competition by co-operation and thus enhance prices.

Why Not All Push?

A TELEGRAPHIC symposium of retail automobile trade conditions is printed in this issue of AUTOMOTIVE INDUSTRIES. This review of conditions is, generally speaking, more hopeful than any similar review printed since early July. This indicates that a turning of the tide has come. We believe this to be in the main due to consistent efforts of the motor car manufacturers to better a bad situation and certainly, with a turn of affairs for the better, it is time for everyone to give a push on the uphill grade.

Almost daily we hear of manufacturers who have found time, after adjusting their immediate requirements to the changed conditions, to undertake the giant task of putting "pep" into their sales organizations. One of the largest producers of moderate priced cars has called a convention of all of the dealers, an expensive and elaborate function for a factory which has as many dealers as this one. Some parts manufacturers, we know, are increasing their sales and advertising forces with a view of helping through this period by lending encouragement where they can and with a view of keeping their records and order files in shape to be of the best use when delivery dates are reinstated on their books. Some of the accessory makers are going heavily for consumer advertising to again arouse the interest of the trade. The only regret of this situation is that this effort to push is not universal. This is an unusual opportunity for an inventory of the sales machine and for a caulking of the leaks.

It has been a contention of this publication for several months that the slow sales situation was largely due to a psychological condition and that a reflex would come. We are more firmly convinced that this was and is the situation, and now that this anti-buying wave is passing and that prices are of less importance than two months ago, there is an opportunity for constructive effort to aid materially in turning the tide. *Motor World* last week contained an excellent news story of one large dealer who had found instant response to an effort to sell cars.

A few days ago W. H. Booth, a vice-president of the Guaranty Trust Co., in speaking to the implement makers, told them, incidentally, that beginning last May there had been an unusual and unexpected market for investment bonds in small amounts. He spoke specifically of a large bond issue that had been disposed of in amounts averaging \$3000. This further bears out the idea that the non-buying situation was psychological. It was the idea of the people that it was time to invest, rather than buy something they could get along without.

Cannot you, by proper advertising and sales advances, convince the public that a motor car is an investment?

Suppose you should put on all steam in sales and not get direct results! We are not admitting that we think there is a possibility of a well-organized sales campaign flitting now, but imagine that it was possible that it should. Would it be a loss? No!

Suppose, for instance, that you have 500 dealers and an average of ten salesmen to each dealer. Say each of these should call on five prospects daily for a week, and should make a detailed report of each visit. Then you would have 150,000 reports of contact with prospects. If the dealer had properly reported his efforts, you would then have a research into reasons why people are not buying that would be invaluable.

Why not all push? If not for sales, to find out how the pendulum is swinging.

Move Toward Better Business Gains

Sales Resistance Slowly Giving Way

Clearing of Election Uncertainty Helps Toward Stabilization— Few Markets Weak

NEW YORK, Nov. 8—Another survey by AUTOMOTIVE INDUSTRIES of trade conditions in the automotive distribution centers of the country discloses a general continuation of the improvement noted two weeks ago. In a few cases the upward trend was halted just before election but when the votes were counted the gain began again almost immediately. Regardless of the politics involved, the fact that election is over will have a stabilizing influence. More or less uncertainty always exists during a Presidential campaign.

The readjustment now under way is chiefly economic, however, and the return to normal conditions depends very largely upon the stabilization of prices in general at a level where sales resistance will end. In this connection the prices of automobiles make much less difference than do the prices of shoes, clothing, food and fuel.

In most cities aggressive sales campaigns are bringing results and it is evident that hard work will bring the reward which it always merits. While the larger dealers have taken their coats off and begun a sturdy battle to get business, the dealers in most of the smaller towns still seem to be waiting for business to come to them. This lethargic attitude is militating against them.

The upward trend of business is not confined to a few sections but is general. There has been no flood of orders but a greatly increased interest in motor cars, more prospects and more actual sales. These conditions prevail in New York, Boston, Atlanta, Columbus, Denver, Salt Lake, Louisville, Omaha, Cleveland, St. Louis, Buffalo, New Orleans, Indianapolis and San Francisco. The weakest markets are found in Minneapolis, Milwaukee and Des Moines. Business in Portland, Ore., and Chicago seems to be at a standstill.

Dealers and Salesmen to Help Boom Trade

BOSTON, Nov. 6—Motor conditions have improved in Boston in the last few weeks. With the election out of the way dealers are beginning to be optimistic. They feel that change of national administration means an end of uncertainty because the vote was so emphatic. Some dealers now are planning to build

INQUIRIES DISCLOSE REVIVAL UNDER WAY

COLUMBUS, Nov. 6—The recent improvement in the automobile business in Columbus and central Ohio continues. All local dealers unite in saying that there is a better feeling in trade circles, with sales showing up better every week. The lull occasioned by the price adjustment is gradually passing and in its stead comes a steady stream of inquiries. While business is not yet normal, it is showing a strong tendency to revive and is expected to improve from this time on. The purchasing power of the public is still good and there is a disposition to go ahead with purchases of passenger cars and trucks. The ending of the political campaign is also expected to stimulate trade.

up their organizations by adding salesmen and paying them salaries instead of commissions. Live dealers are taking advantage of the laying off by other companies of good salesmen to add them to their forces. In October, Massachusetts registered about 1600 motor vehicles a week, which shows people are buying.

Resumption of Orders Gives Dealers Hope

BUFFALO, Nov. 6—That expectation of further price reductions no longer occupies the prominent place it had a few weeks ago in the minds of prospective buyers was the substance of statements made to-day by local dealers. Would-be buyers, these dealers averred, are beginning to recognize the fact that further price cutting is not reasonably to be looked for, and as a result some of them are placing orders. They have not been numerous enough as yet, however, to greatly strengthen the market which, according to the average dealer, continues slow with little if any improvement noticeable in the last week. But Buffalo dealers are not apprehensive.

REDUCED CARS FAVORED

CLEVELAND, Nov. 6—Price reductions have brought a slight stimulation in retail sales in Cleveland, although trade is yet below normal. Machines that have been reduced in price are selling better than those that are retailing for the figure fixed months ago. Outside of Cleveland retail trade is not so good as in this city. Credit conditions are not good and this has slowed purchases, and the slow down in industrial production has hurt trade.

Demand Strengthens 60 Per Cent in Month

Increase in Salesmen and Better Crop Prices Develop Southern Trade

NEW ORLEANS, Nov. 6—Upward movement in the demand for passenger cars seems to be continuing steadily though dealers declare it will be difficult to estimate the percentage of improvement until the end of the month. Some dealers attribute the improvement to the increased number of salesmen most of them have put on, and others to the apparent stabilization of sugar, rice and cotton markets. H. B. Moody, secretary of New Orleans Dealers' Association, said:

"Better feeling is manifest among all local dealers, who are unanimous in statements that demand has strengthened at least 60 per cent in the past thirty days and that demand is continuing to strengthen at apparently about the same rate. All dealers and salesmen are working harder than ever before but are getting results. The coming winter season promises to be good for hustling dealers but bad for those who continue the practice of sitting at desks and waiting for orders to come in. The tendency of buyers to pay all cash for cars is marked. One dealer here sold fourteen passenger cars for cash the first week in November."

INDIANA FEELS WORST IS OVER

INDIANAPOLIS, Nov. 6—On the whole the recent improvement in trade conditions holds fairly good and is far ahead of the low level of the August and September slump. However, in the week preceding election business fell off somewhat for some dealers. Biddle Brothers, Franklin agents, sold four new cars last week and several used cars. Jones Whitaker Co., Chevrolet dealers, report that in October twenty-two cars were sold. Dealers here at the first annual convention of the Indiana Automobile Dealers Association feel that the worst is over.

IOWA CONDITIONS TIGHTER

DES MOINES, Nov. 6—Des Moines distributors agree that there has been no change for the better in the past two weeks. In fact, conditions during that period have been slightly tighter than the previous two weeks. This further tightening is attributed to the desire to wait to see what election would do to the country's financial situation. No material change is expected until Jan. 1.

Dealers' Campaigns Gather Force

Chicago Business Continues Hesitant

Aggressive Sales Campaign Helps Clear Used Car Stocks—Crop Prices Poor

CHICAGO, Nov. 6—Conditions in the automobile trade in Chicago remain practically unchanged since the last review with no indications of an improvement in the new car market. A very slight improvement is noted in used cars by some dealers, due to an aggressive sales campaign. The buying public is not yet satisfied on the point of price reduction and is still hesitating in making purchases.

Chicago is the distributing center for a vast agricultural section and distributors find the situation far from satisfactory, primarily because of the continued restriction on credits by country bankers and secondarily because of the low prices which the farmer is able to get for his produce.

This condition among the farming communities is reflected in the decreased earnings and the cutting down of forces of the mail order houses here. No effort is made at being optimistic, conditions among all dealers and distributors along the row being practically the same.

LOW COTTON, TRADE DRAWBACK

ATLANTA, Nov. 6—Improvement in the automobile sales outlook continues gradually, but low prices on cotton still retard sales. Improvement is more rapid in the Carolinas and in Florida. Dealers expect this condition to continue for thirty days and then look for greater improvement and return to normal. They believe business will settle down now that election is over. George Hanson states that sales are gradually picking up and he believes conditions will be normal after the first of the year. Less improvement is noted among dealers in smaller towns which is due mainly to the low price of cotton.

USED CARS OFFSET CHANCES

LOUISVILLE, Nov. 6—The automobile situation in Louisville at present is good. Ford dealers report deliveries in not less than ten days time. Other dealers report new car business would be good if sales could be found for cars taken in trade. Sales of used cars are slow, thereby cutting down the sale of new cars to a great extent as buyers have old cars on hand to trade in on new cars. Conditions at this time have not been retarded but continue favorable. Several dealers are moving into better locations and are preparing for the winter months.

ST. LOUIS RALLYING AFTER BRIEF SETBACK

ST. LOUIS, Nov. 6—Motor car dealers in St. Louis report that trade was improving steadily until last week, when it received a considerable setback. One big dealer reported that it was the worst week in the history of his business. The dullness was due largely to the bad weather, however. This week has started out more auspiciously and considerable improvement has been noted. The election and the better weather conditions are believed to be responsible.

Weather Helps Trade in Omaha District

OMAHA, Nov. 6—Conflicting reports are made by Omaha dealers and distributors as to the condition of trade, but the general tone is of slightly more confidence than thirty days ago. Typical comment follows:

Nebraska Buick Co.—"There is no real change to report, but it could scarcely be worse in situation or outlook. Causes are the advent of the dull season and difficulty in retail financing. There is no prospect of betterment until after New Year's."

J. H. Hansen, Cadillac Co.—"Business is slightly better. The weather is exceptionally good for this season and farmers are feeling better with the upturn in wheat prices following their crop-holding threat. The passing of election has stabilized business confidence."

Hart Motor Co. (Ford).—"We have had a slight increase in business, but we are not sure whether it will be sustained or is the result of closing sales long in suspense. Trade in general appears seasonably dull."

Guy L. Smith, Hudson Co.—"Trade is considerably better, but not to be compared with the same time last year. Financing and election uncertainty are responsible."

DENVER OUTLOOK BRIGHTENS

DENVER, Nov. 6—Improved tone in the automobile market continues to strengthen gradually and a substantial gain is expected when the sugar beet farmers get their first pay on this year's sugar beet crop now being delivered to factories. Some dealers still are gloomy about money tightness in general and particularly about the standstill of wheat and other crops, but other dealers are cheerful because more people are looking and buying, and some enthusiastically predict a big forward movement soon in both cars and trucks.

Utah Finds Trade Greatly Improved

General Development Since August Meets Temporary Check in Election Interest

SALT LAKE CITY, Utah, Nov. 6—In spite of the fact that the election has been used as an excuse for everything from bank robbery to murder, the automobile and truck dealers of the intermountain country and Salt Lake in particular claim that for the past month their business has been retarded by the interest in the campaign.

The general tone of business conditions in the automotive world here is much better than during the summer months. The welcome change began in August and from every point came pleasing tidings and encouraging reports. The market continued to grow better until about a month ago, when, although not sliding backward, the motor world here came to a standstill and no great increase in sales was reported.

The consensus of opinion among dealers here is that from now on business will rapidly approach the point they wish for. They base their prediction upon the business which has been promised to them after election. All their prospects have stated that when the campaign issues faded into the background they would turn their attention to purchasing automobiles and trucks.

San Francisco Finds Noticeable Increase

SAN FRANCISCO, Nov. 6—Although there are plenty of cars in San Francisco warehouses, distributors of standard makes of automobiles express the belief that they will soon fade away under the demand which has already started. Rains throughout northern California, insuring better crop conditions for the farmer and relieving power shortage, brought smiles to faces of business men here. Dealers declare more people are on the row shopping and that an increase in business is noticeable. Franklin, Cadillac, Buick, Studebaker and Hupmobile are among those who declared the past month good. The used car market is unquestionably slow and dealers are uncertain as to prices to allow on trades. This is holding up many sales. All expect conditions to improve further now that election is over. The automobile show, which is scheduled for February, is expected to be the final push to put business back to normal and over the top into the prosperity column.

Makers Confident Low Mark Reached

Ford, Buick and Dodge Hold Up October Figures in Detroit District

DETROIT, Nov. 8—Exclusive of Ford, Dodge and Buick production, only 10,432 passenger automobiles were built in the Detroit territory in October. This territory includes all of Michigan as well as the Overland and Willys-Knight plants in Ohio. This compares with 27,251 built in September, exclusive of the same three factories. The total produced in October was 124,439 compared with 139,290 in September.

The Ford factory reported a record month for October with 99,967 cars and trucks. The daily record was established Oct. 26 with a production of 4688. Dodge started October with a schedule of 625 daily and maintained it throughout the month. Buick built 12,690 in October but announces this schedule will be cut from 550 daily to 350 daily from Dec. 1.

Hupp, which had been running to capacity in spite of the slump, cut production from around 2500 a month to ten a day on Oct. 1 and the factory now is operating on that schedule. Cadillac maintained capacity production and put out 2000 cars in October despite a 25 per cent reduction in the number of employees two months ago. Increased labor efficiency permitted maintenance of the capacity schedule, according to Vice-president Layng.

A majority of the plants are taking advantage of the slump to take inventory and making no attempt at production. Oakland, which was down the greater part of October, will resume Nov. 15, according to President Warner. Chevrolet averaged 85 daily from Oct. 15 and will try to maintain that schedule indefinitely. Oldsmobile is taking inventory and will be down indefinitely.

Packard Works on Single Six

Packard is working hard on the new single six but is building only inclosed models of the twin six. Production for October was cut about 50 per cent from normal, which is around 750. Packard is building practically no trucks. Paige was about 35 per cent under the September output of passenger cars and did virtually nothing with trucks. Paige officials expect a slight improvement for November, however.

Studebaker is running full blast in its South Bend plant but was away off in production at its Detroit plant, the October production in which was 2600, or about 35 per cent under capacity. The Detroit factory is running only four days a week. Saxon and Scripps were down the greater part of October and their production was off 60 per cent. Hudson-Essex has been practically closed but will open some departments this week. Liberty and Columbia were

approximately 70 per cent off in October production. King built only about 30 cars in October before the receivership.

All executives report a slight upward trend in business, and with confidence returning throughout the country look for a marked improvement by the first of the year with the outlook good for a return to normal in the early spring.

The Gemmer Mfg. Co., which makes steering gears for sixty companies, has been down for two months but probably will reopen Dec. 1, according to Vice-president Wilder, who says the factories have practically exhausted their supplies in balancing inventories.

The Willys-Overland plant at Toledo closed Saturday but officials say some departments will be reopened in two weeks and the entire plant after a complete inventory.

(Continued on page 994)

Election Interest Affects Coast Sales

PORTLAND, ORE., Nov. 6—The election has overshadowed buying interest in automobiles for the past week or ten days. Consequently there has been little activity in any line. Even Fords have been moving slowly.

This has temporarily offset the returning interest recently noted in motor cars following stabilization of the market after price drops. However, dealers here believe the election has cleared the air. For example, one distributor shortly before election had his salesmen interview prospects as to their buying intentions. Sixty prospects said they expected to buy new cars if Harding were elected, while only three were intending to buy in the event of Cox's election. Discounting these by one third, he figures forty sales to these prospects alone.

Lower Price Hope Holds Sales Over

MINNEAPOLIS, Nov. 6—Even optimists in the trade are not expecting much business before spring in automobiles, though some dealers are having nibbles and the enclosed car trade has perked up. In the cities in general there is little improvement in sales. In fact, enclosed car business involved some long trade. The money situation has not improved and people seem to be waiting for spring before closing.

Cuts in prices and guarantees against declines seem to have hurt business, as prospects are saying that the factories that can make such heavy cuts have been getting too much money and can make another drop before summer. It is a waiting game by the public and little buying is expected before the annual shows.

MASON CUTS TIRE PRICES

KENT, OHIO, Nov. 8—The Mason Tire & Rubber Co. announces a 12½ per cent reduction in prices to consumers on all tires including fabric, junior cord and regular cord, tubes and all pneumatic, solid and cushion truck tires.

Harvester Prepares for Truck Demand

Export Orders Keep Company at Capacity—New Plants Soon to Open

AKRON, Nov. 6.—That the employed force at the International Harvester Co. truck works here would be greatly increased during the next year in the face of adverse general conditions, is the report from the offices. The increases will be the direct result of the completion of the Ft. Wayne assembly works, and the Springfield, O., speed truck works.

The Akron works are running to the utmost of their limited facilities to-day. Every available foot of space is being utilized and an additional building is now under construction. More men are in the employ of the company than at this time a year ago, and at this time a week ago even, and in spite of the great increase in the number of unemployed men in the country, the wage level has not been lowered.

The slump that is so prevalent in the automobile industry has not affected the Akron motor truck works in any way. The I. H. C. machines are finding ready markets all over the world. Export shipments are a big factor in the truck sales.

With the completion of the midwest assembly works at Ft. Wayne, the local plant will be changed over gradually to machine production completely. The space now utilized for assembly, body building and painting of the trucks will be used for machine shops, with a relatively greater number of employees. At the same time the unlimited assembly facilities of the 137 acre assembly plant will make possible the construction of many times the number of trucks now produced daily, with the resultant great increase in work for the Akron plant. All machined parts will be made in Akron and the truck will be built in Ft. Wayne just as soon as the plant there is completed, and that will probably be by next spring.

The Springfield speed truck works personnel is also being built up at the Akron plant to-day, and foremen are being schooled under actual production conditions in the work they will have to do in the new plant. The Springfield plant may also help to keep the local works busy, as many of the parts used in the new truck may have to be made in Akron. International Harvester officials and employees are most optimistic over the future of the local organization.

TRUCK MANUFACTURERS TO MEET

CHICAGO, Nov. 6—The Motor Truck Manufacturers' Association will hold a convention in Detroit in connection with the meeting of the Motor Truck Sales Managers' Association on Nov. 18 and 19. Matters pertaining to the industry will be taken up and views exchanged on the problems of the individual members.

Business Reaction Studied by Reserve

Alternatives Facing Industry Discussed in Chicago Report— Public Must Re-enter Market

CHICAGO, Nov. 9—In its monthly report, the Federal Reserve Bank of Chicago, for the Seventh Federal Reserve District which embraces in its scope the state of Michigan, pays special attention to the automobile industry, directing notice to the four alternatives which faced the manufacturer when the "public demanded just as good cars at 'lower cost.'" It finds that prices are both higher and lower than a year ago and that they are higher than during the pre-war period.

"Advices indicate that transportation facilities as they relate to the automobile industry are better, but that fuel is considerably below the normal supply. Prices are reported from 8 per cent lower to 7 per cent higher than a year ago, and from 15 to 36 per cent higher than the pre-war period. Declines are reported in some of the raw materials but advances in others tend to offset the savings elsewhere. Wages continue firm but production is beginning to decline as evidence of overproduction and the strained credit situation begin to press prices downward.

"The automobile industry, confronted by the public demand for just as good cars at 'lower cost' has had to think fast and correctly or take the drastic penalty of temporary (or permanent) loss of trade prestige and 'goodwill,' as well as loss of current orders. The difficulty of meeting the situation was the more serious for the reason that manufacturers possessed of abundant inventories of raw materials, had paid for them the top prices and they had either to stand heavy loss on such materials or else face the peril of losing sales now and hereafter.

"In order to meet the situation, some of the manufacturers have adopted one or more of four expedients, namely, making a flat reduction in price, or announcing their intention of adhering to an announced price for a definite time, thus stabilizing the selling quotation, or guaranteeing the price for a fixed time, with a pledge that any reduction meantime shall be retroactive to current buyers, or making a temporary reduction in current prices until Jan. 1. The last named carries with it the intimation of a restoration of prices after the first of the year."

The review then goes on to say that interest in the Middle West is centered upon the question of how soon the public will "again enter the market and absorb goods for consumption."

In returning to the automobile industry it says:

"Those who have taken the step of cutting prices of their products, as for instance, one of the large motor companies expresses conviction that this pro-

cedure is quite as much for their own ultimate good as for the general welfare; that in the end the concern will earn a greater profit under the policy than by attempting to hold out against the inevitable.

"This class of manufacturers, as expressed by one of them, is proceeding on the idea 'that prices are coming down because they must—not because costs have been lower, but because business in this country cannot resume its normal volume and confidence until the adequate buying power of the dollar has been restored'."

Spring Sales Grow in Milwaukee Zone

MILWAUKEE, Nov. 6—Recent improvement locally and throughout the state in the automobile market has been slightly retarded for prompt business, but spring delivery orders have been materially increased. Alfred H. Reeke of Nash, Tom McMillan of Overland, Jesse A. Smith of Hudson and Essex, G. H. Williams of Franklin, and Ford dealers all report October totals better than September in retail sales, and October satisfactory in comparison with a year ago.

Distributors still find interior dealers slow and uninterested in used cars. This market is dead, including enclosed jobs. Present buyers want new cars. Large dealers are making a rule that salesmen must dispose of one used car for every additional one taken in trade. State dealers are being notified that factories will restrict styles and not ship in advance of definite orders, and dealers are asked to order only for actual requirements. Everyone is confident of big spring business revival.

Goodyear Initiates Trade Acceptance Plan

AKRON, Nov. 8—While no official statement has been forthcoming from the Goodyear Tire & Rubber Co., it is understood here that it has obtained \$10,000,000 in cash at 9 per cent and will have a balance of \$20,000,000 on trade acceptances from Becker & Co. and the Continental and Commercial Trust Co. of Chicago on a basis of trade acceptances. It is known that Goodyear is going after dealers' orders for spring on the trade acceptance plan in order to rush big orders in and negotiate loans on them.

HELD FOR STOCK DEPRESSION

CLEVELAND, Nov. 8—Barton Pittman of Columbus has been held under \$2,000 bail for a hearing here after his arrest on a charge of having "unlawful intent to depress the value of the stocks and securities of the Templar Motors Co." He pleaded not guilty when arraigned. It is alleged that Pittman was able, by means of derogatory circulars, to buy up Templar stock at less than its market value and then re-sell it at a profit.

Publishers Approve Publicity for Show

Everything in Reason Promised Space by Association—Em- bargo Temporarily Lifted

NEW YORK, Nov. 8—Newspapers have lifted the ban on automobile publicity for show week.

Information to this effect has been sent to the National Automobile Chamber of Commerce and the Automobile Dealers' Association. The notice from the Publishers' Association said everything within reason would be done to promote the interests of the show and the manufacturers represented there. There will be no more restrictions than in the past of the use of car names and companies.

No action has been taken by the publishers in regard to the embargo on automobile news at other periods of the year. As a matter of fact, the little news which has been used in the last few months has been of a little higher type than formerly was the case. Much of it was of an informative nature but there has been no relaxation of the rule against the use of names. Almost the only exceptions have been in the cases of price cuts, financial statements and failures.

The automobile interests propose to take the question up with the publishers again at an early date and see if the industry cannot be established on an equitable basis with the newspapers. It is contended that it should be treated at least as liberally as real estate, which is advertised to a much smaller extent. The theatres and professional sports offer another case in point. No attempt will be made to revert to the old type of publicity which appears, happily, to have gone into the discard permanently. Newspapers are not so hard pressed for space as they were a short time ago.

GASOLINE EXPORTS GROW

NEW ORLEANS, Nov. 9—The exports of gasoline from New Orleans, mainly to Latin-America, have increased approximately 3000 per cent in the period between 1911 and 1919, according to figures just made public by the research bureau of the New Orleans Association of Commerce. In 1911, this port exported 251,098 gallons of gasoline, and in 1919, the total sent out through New Orleans was 62,295,024 gallons, or approximately 30 times the quantity exported nine years before.

ITALY LIFTS TRUCK BAN

WASHINGTON, Nov. 8—The Italian restrictions on the importation of motor trucks into that country have been lifted, effective Oct. 29. This information is contained in a cablegram from Commercial Attaché H. C. MacLean at Rome to the Bureau of Foreign and Domestic Commerce.

Overland to Stick to Present Models

Not Working on New Cars Says Willys—General Motors Rumor Denied

DETROIT, Nov. 6—During a visit to Toledo and Detroit early this week, John N. Willys took occasion to deny a report that the Overland is at work now on new model cars to be placed on the market, or that the company was planning to revise the model 90. Willys said unusually good sales for Overlands had continued during recent months in many districts, particularly in New York and the East. Willys sees promise of betterment of present business conditions and predicts a rally from the slump of the past few months after the first of the year.

C. A. Earl, vice-president of Willys-Overland, in denying reports that the company would stop production on the Overland Four, declared he was becoming tired of issuing denials of the many rumors that were being spread around the country regarding his company. He said there was no truth in the report that General Motors would take over the Willys interests, denied that it was the plan to stop production on Overland Four, and move the Chevrolet from Tarrytown to the Overland factory, and denied absolutely that the Overland company was being compelled to pay Ford Motor company a royalty of \$100 a car, on account of a patent infringement.

"Just say for me that Overland is in production and that our sales for the past few months have been gratifying, in consideration of the slump and its generally bad business conditions," said Mr. Earl. "Of course, no one can foretell the future, but we look for better business within the next few months, and with a hard, steady pull, I am confident the industry will come through in good shape. As for Overland, I am not the least bit discouraged as a result of present conditions but rather gratified at the outlook within the next 90 days."

IMPROVE TIER-LIFT TRUCK

CLEVELAND, Nov. 5—The Lakewood Engine Co. of this city has increased the lifting range of its tier-lifting truck to 96 in., and has also brought out a new model of truck embodying double lifting speeds for users handling light, bulky packages. This model has a lifting and load carrying capacity of 2000 lb.

TO MAKE SPENCER LIGHT CAR

DAYTON, OHIO, Nov. 6—The Research Engineering Co. of this city has increased its capital to \$200,000 in order to manufacture the Spencer air-cooled car, a small vehicle designed by its president, O. H. Spencer. Among the mechanical features of the car are a four-cylinder air-cooled engine, a new special de-

sign of transmission and cantilever springs all around. The car complete weighs about 1500 lb. and is to sell at \$1,200. Other officials of the company besides Spencer are Jay A. Weller, vice-president; Kenneth E. Hoy, vice-president; Thomas E. Garster, secretary; Elmer M. Silers, treasurer. A manufacturing site in Dayton is being looked for.

I. C. C. Order Releases More Flat Top Cars

WASHINGTON, Nov. 6—Improved movement of automotive shipments and road material is assured with the Interstate Commerce Commission's order today releasing several thousand gondola cars or cars equipped with racks from the exclusive use of coal shippers.

In amending Service Order No. 20 the commission excluded from the classification as "coal cars" gondola cars with solid sides and solid flat bottoms, having sides 42 inches or less in height, inside measurement, or cars equipped with racks. It is said that the revision was brought about through the persistent appeals of the steel manufacturers for additional equipment to move their products. The order will, however, make available more cars for the automobile trade, particularly the type of trucks and cars shipped on gondolas.

Directors Investigate Erie Rubber Company

SANDUSKY, OHIO, Nov. 8—Affairs of the Erie Tire & Rubber Company are in the hands of an investigating committee consisting of C. H. Walters of Anderson, Attorney D. F. Dunlave of Ashtabula and Judge Spencer of Lisbon, members of the board of directors, which will report in ten days. At the meeting of the stockholders last week Chairman Walters declared the company solvent. Accounts receivable amount to \$291,664 and the liabilities to \$281,043.81. Raw material, finished product, etc., are worth \$750,000. He alleged that Z. H. Roth, former treasurer, had drawn vouchers for \$37,000 since his resignation.

CREDITORS FILE BUS PETITION

NEW YORK, Nov. 6—An involuntary petition in bankruptcy has been filed in the United States District Court here against the American Motor Bus Co. by three creditors whose claims aggregate less than \$1,000. Janney, Steinmetz & Co. of Philadelphia have a claim of \$583.13 on six promissory notes; the Machinists Supply Co. of Chicago, \$240.96, and Charles H. Besly & Co., also of Chicago, \$47.50, for materials.

TO INCREASE TRUCK OUTPUT

PONTIAC, MICH., Nov. 8—Production of 400 trucks in December is the program mapped out by the General Motors Truck Co. It is expected operations will be resumed by Dec. 1 on practically a full time schedule.

Cleveland Presents St. Lawrence Views

White Official Sees Difficulties Owing to Freezing and High Insurance

CLEVELAND, Nov. 8.—Many of the largest manufacturers of this city and the Ohio valley territory, who are following with keen interest the proposal to open the Great Lakes to ocean going ships, testified at the hearing here before the International Joint Waterways Commission, which is to report to the governments of the United States and Canada on the proposal.

Cleveland automobile manufacturers are keenly interested in the subject, and they had several representatives present to listen to the testimony. George H. Kelley, vice-president of the White Co., told the commission that his company naturally was interested in any proposal that would help develop foreign trade. His company was sympathetic and then he left with the commission these suggestions:

1. The Insurance rates from Montreal are considerably higher than from New York, so much so that they offset any advantage ocean shipping from the inland has over the rail-ocean shipping.

2. The ocean route from this city would be available but a few months in the year, while work must be done continually in the foreign trade department, if it is to grow.

H. E. Ashbruner, sales manager for the American Multigraph Co., of this city, gave testimony that was typical of that offered by the average witness. Ashbruner predicted that foreign trade in this section would develop to such an extent in the next few years that even greater railroad congestion would result, and that unless additional transportation facilities were provided manufacturers would suffer in competition with European made goods. He declared that the lesser number of handlings of goods by ocean shipping was a factor of immense value to the shipper, and he argued that the shipper could afford to pay from 3 to 5 cents more per cubic foot for ocean shipping than for rail-water.

Would Help Akron Plants

R. G. Kreitler, traffic manager of the Goodyear Tire & Rubber Co., Akron, told the commission that traffic between Cleveland and Akron in rubber goods was growing by leaps and bounds, and that in his opinion the proposed ocean route would help Akron rubber companies to develop foreign trade, although Kreitler made it plain that a number of problems would have to be solved before the project was complete.

American members of the commission are former Senator Obadiah Gardner, of Maine; former Senator Clarence D. Clark, of Wyoming; and William H. Smith, secretary. The Canadian members are Charles A. McGrath, Sir William Hearst and L. J. Burpee, secretary.

Ford Not Interested in Zeppelin Plans

Contrary to Policy to Join Syndicates, Says Mayo—Has Plans of Own

DETROIT, Nov. 8.—Reports that Henry Ford is interested in a syndicate which will finance a big Zeppelin dirigible program were denied to-day at the office of W. B. Mayo, his chief engineer.

The denial was based upon a story from Akron to the effect that Ford is backing a trans-Atlantic dirigible service, that he has a contract with the Zeppelins for the construction of huge airships in Detroit, that he is negotiating for the purchase of a new 1,100 ft. ship built by England and that a training field for dirigible pilots and crews will be established near Lakewood, N. J., by Ford and German interests as soon as peace with Germany is established.

The following statement regarding Ford's aircraft plans was authorized by Mayo:

"Mr. Ford has for some time been interested in aircraft development and expects eventually to become active. There is absolutely no truth, however, in the report that our company is interested in a plan to finance a dirigible program and a trans-Atlantic Zeppelin service. Neither Ford nor the Ford company has a contract for Zeppelin construction in Detroit and it is untrue that either has bought or is negotiating for an English ship."

"The Dearborn plant from which tractor production has been removed to the River Rouge now is being used as an experimental station. The eventual disposition of the Dearborn plant has not been determined but it may become a car shop for the Detroit, Toledo & Ironton Railroad. There is not the slightest intention now to use it for aircraft development. It is not the Ford policy to join syndicates and when Mr. Ford decides to engage in an aircraft development program it will be solely a Henry Ford enterprise. That is far in the future, however. We have too many other things to occupy our minds now."

CURTIS TO BUILD TRACTOR

LITTLE ROCK, ARK., Nov. 6.—The Curtis Motor Car Co. is arranging to manufacture farm tractors. The first model has been constructed and is on display at the factory here. A. W. Sloss, general manager, says active production will start in the next thirty or forty days.

TO BUILD REFRIGERATOR TRUCKS

SPRINGFIELD, MASS., Nov. 6.—That increased freight rates, shortage of railroad rolling equipment and other details resulting in an expensive, delayed and generally unsatisfactory service are likely to result in substitution on a large scale of specially designed motor trucks

for refrigerator cars in the handling of meat and other perishable food supplies for all but through and long distance hauls, is indicated in negotiations now under way for transfer of the old trolley wheel factory plant at Northampton to the Refrigerator Truck Co. of Boston. It is understood that details toward consummation of the deal are being worked out now. The plant has been rented for some time by the Boston corporation.

Advance-Rumely Makes Special Farm Truck

LA PORTE, IND., Nov. 6.—A 1½-ton truck, specially designed for use by farmers, has been brought out by the Advance-Rumely Thresher Co. of this city. It is equipped with a unit power plant, and is fitted with a grain type express body. By means of suitable extensions, a larger capacity can be obtained for hauling lighter loads such as forage, livestock, etc. The trucks are being produced in the Chicago plant.

The engine is of the heavy duty, 4 cylinder block type, of $3\frac{3}{4} \times 5\frac{1}{4}$ in. cylinder dimensions. It has a removable head, and three point suspension. Ignition is by a high tension magneto with automatic impulse starter. A centrifugal type of governor is fitted, and is set to control the truck speed to 15 m.p.h. for solid tires, or 20 m.p.h. for pneumatic tires.

Engine lubrication is by the full force feed system, with a gear type pump, while chassis lubrication is by the high pressure grease system. Cooling water is circulated by the centrifugal pump, and the radiator is provided with a shroud over the fan. The final drive is by worm and worm wheel, two ratios being offered, viz.: 6.5:1 and 7.8:1. Thermoid-Hardy disk universals are used. The weight of the chassis with the solid tire equipment, without gasoline or water, is 3950 lb., and that of the chassis with body complete, 5,650 lb. Pneumatic equipment, 36 x 6 in. in front and 38 x 7 in. in the rear, is special. The regular tire equipment consists of solids, 36 x 3½ front, 36 x 5 rear. The wheelbase is 144 in.

LIBERTY COMPANY ORGANIZED

NEW YORK, Nov. 8.—The Liberty Mfg. Co. has been incorporated with \$3,000,000 common stock at Stratford, Conn., to manufacture the Cameron air-cooled engine for automobiles, trucks and tractors. Tests are being made of an exceptionally light weight car with a wheelbase of 105 in., which it is expected will be manufactured shortly.

CANADIAN FORD SLOWS DOWN

WINDSOR, ONT., Nov. 8.—The Ford Motor Company of Canada will cut its working time to four days a week, continuing for an indefinite period. General Manager McGregor feels it is better to keep the present staff employed part time than to lay off more men. Already 10 per cent of normal staff have been laid off.

Handley-Knight Car Placed on Market

Chicago and Detroit Distributors Get First of Output—Price Fixed at \$2,985

KALAMAZOO, MICH., Nov. 5.—The Handley-Knight Co. has started delivery on its new Knight car. This company was incorporated under the laws of Delaware Jan. 6, 1920, for 80,000 shares of no par value stock. Forty thousand shares of this were authorized for sale, netting the company \$25 per share. Ground was broken for the factory on April 10 and the first experimental car completed July 1. The first deliveries were to the Detroit and Chicago dealers on Oct. 31. The plant is an 80 by 800 ft. structure laid out for a possible production of at least 5000 cars per year. It is a saw-tooth building adapted particularly for assembly and is on a 40-acre plot, providing ample grounds for expansion. It is located between the Grand Trunk and Pennsylvania railroad systems with sidings to each, being in a particularly convenient position as regards shipping.

The new car is strictly an assembled proposition, the engine being the 4½ by 4½-in., four-cylinder Knight sleeve valve type, which has been made for several years at the Willys-Overland plant in Elyria. The car is equipped with Auto-Lite electrical system, Connecticut ignition, Tillotson carburetor, Borg & Beck clutch, Grant-Lees transmission, Thermoid-universal joints, Timken axles, Mather springs, Gemmer steering gear and Ohio body. It is mounted on a 125-in. wheelbase and sells at \$2,985 f.o.b. factory in the seven-passenger touring car form. The price of the seven-passenger sedan has not as yet been fixed.

The engine develops approximately 48 hp. at 1800 r.p.m. and the car is geared 4 5/11 to 1, the speed range being approximately from 3 to 60 m.p.h. The engine is provided with aluminum pistons and a 2-in. three-bearing crankshaft. The clutch is a 12-in. type and the propeller shaft diameter is 1 ¼ in. The drive is of the Hotchkiss type, the rear springs being 61 in. long. A feature of the springs is the large bolt on the front of the rear spring, which is 1 ¼ in. in diameter.

ROUSSEY-CENTLIVRE BUILDS

FORT WAYNE, IND., Nov. 8.—The new tire factory of the Roussey-Centlivre Rubber Co. of this city is now being erected. The site lies in the eastern part of the city between Lincoln Highway and the Nickel Plate Railroad and is considered an excellent location. The factory will be one story in height, 60 ft. wide and 240 ft. long. It will be the first unit to be erected, although plans have been prepared for a much more comprehensive and extensive plant. The concern is owned almost exclusively by five local capitalists.

America Predominant in Brazilian Car Imports

Assumes Big Lead in 13-Year Period

Statistics Show Greatest Trade Development in First Six Months of 1920

RIO DE JANEIRO, Nov. 6—There have been imported into Brazil from January, 1907, up to June 30, 1920, a total of 24,475 automobiles, according to the Automobile Association of Brazil, otherwise known as the Associação Automobilista Brasileira. These figures are looked upon as the most accurate that have come from any source. Previous to January 1, 1907, no statistics were made, but the very limited number of vehicles imported previous to that time can be neglected so far as the general estimate of to-day is concerned. To this total of 24,475 should be added 1200 Fords which were imported in semi-knockdown condition, this giving a grand total of 25,675 imported vehicles. Previous to this year all Fords imported into Brazil were in a completely disassembled condition, but those now being received in semi-knockdown condition are included in the government import reports. These figures include cars and trucks.

Of this total 15,109 vehicles, which includes cars and trucks, have been imported from the United States, the next country figuring in these imports being France, from which 3018 were imported. France is followed by Germany with 2277, Italy with 1282, and Great Britain with 586. European importations were all previous to the war.

The following tabulation shows the complete importations from different countries from January, 1907, to June 30, 1920, with the exception that the 1200 Fords referred to are not included:

Argentina	115
Austria-Hungary	12
Belgium	271
Canada	1
France	3,018
Great Britain	586
Germany	2,277
Italy	1,282
Paraguay	4
Portugal	25
Spain	7
United States	15,109
Sweden	36
Switzerland	506
Uruguay	128
Unclassified	1,098
Total	24,475

When the importation of automobiles by years is considered, more were imported during the first six months of 1920 than in any other year. In these six months 5082 vehicles were imported, as compared with a total of 4537 for all 1919. Importations during 1912 and 1913



Great Potential Trade Territory Offered by Brazil

were largest of any year previous to 1919, as the following figures show. In interpreting the heavy increase in 1919 it should be remembered that the Ford Motor Co. opened its branch in Brazil in May, 1919:

1907	366
1908	297
1909	306
1910	735
1911	1,574
1912	3,785
1913	3,218
1914	744
1915	214
1916	521
1917	1,648
1918	1,448
1919	4,537
1920 (6 mos.)	5,082
Total	24,475

The ports through which most of the vehicles are imported into Brazil are Rio de Janeiro, located in the Federal district, which corresponds with Washington, D. C., and Santos, which is really the seaport of Sao Paulo. The 7458 vehicles imported at Rio were very largely

shipped into the interior of the country and not used in the Federal district. The same applies to Sao Paulo, where many of the vehicles were distributed into neighboring states. This also applies to Pernambuco, which imported 1149.

The following tabulation shows general distribution of imported vehicles throughout the states when these considerations are kept in mind:

Amazonas	132
Alagoas	29
Bahia	513
Ceara	72
Rio de Janeiro	7,458
Espirito Santo	4
Maranhao	76
Mata Grosso	22
Para	313
Parahyba	6
Parana	70
Pernambuco	1,149
Rio Grande do Norte	4
Rio Grande do Sul	2,765
Santa Catharina	27
Sao Paulo	9,968
Sergipe	1
Other states	1,866
Total	24,475

Industries Abroad Regaining Standing

Industrial Unrest Reported Vanishing—Trade With America Hurt by Exchange

NEW YORK, Nov. 5—An encouraging picture of conditions in Europe was given by A. C. Pearson, general manager of the *Dry Goods Economist*, in an address to-day before the heads of departments of the United Publishers Corp. He spoke from first hand information obtained on a two months' trip to the principal centers on the Continent and in England and Ireland. Mr. Pearson is a trained observer and has made many trips abroad. His purpose on this journey was to gain a first hand knowledge of the state of business in the countries visited with relation to the United States. His facts were obtained from leaders in industry, friends of long standing.

Post-war depression attendant upon deflation and readjustment are present in all countries of Europe to a greater degree than on this side of the Atlantic, although it is asserted the United States is responsible for the slump because it was here prices first began to drop.

One important factor in the curtailment of production abroad was the cancellation of orders from the United States and this has caused indignation, especially in England. This is due to the fact that a contract in the older countries is an obligation which cannot be regarded as a scrap of paper. It is negotiable at banks and always is regarded as an asset. Cancellations lead to the courts for adjudication. For this reason it is difficult for business men abroad to understand the American viewpoint, although they have accepted it in taking orders. Nevertheless they regard the cancellation of a contract as the evasion of a moral obligation.

Bolshevist Menace Vanishing

Mr. Pearson's observations led him to take an optimistic view of the future. He considers the menace of Bolshevism vanishing and that there is no serious danger of a dictatorship of the proletariat. As a matter of fact the wave of radicalism which has swept Europe has been of value to far-seeing employers. They have bowed to the necessity of taking their workers into their confidence and granted them a larger voice in factory management but they have seized the opportunity to instill greater enthusiasm into their employees and thereby increase production without a corresponding increase in costs.

The reaction of his trip in the mind of Mr. Pearson apparently was that in spite of all the obstacles with which they are confronted, the war-ravaged nations of the old world are making substantial progress in their struggle to "come back." Industry is dead in none of them. Depreciated currency and lack of raw materials are their chief problems.

AUTOMOTIVE INDUSTRIES THE AUTOMOBILE

Ramifications of the exchange situation were sketched impressively by Mr. Pearson. For all practical purposes, he said, the pound sterling could be considered at par in relation to the money of other countries while the American dollar is at a 50 per cent premium. French and Belgian francs, German marks, Czechoslovakian and Austrian crowns and Italian lira are far below par and their value in relation to sterling represents their comparative standing with England from an economic and industrial viewpoint.

Exchange Rate Hurts Pride

While British pride has been hurt by the depreciation of the pound as compared with the dollar, it has aided British manufacturers to gain a foothold in other countries in competition with Americans, for it is cheaper to buy the same goods in England with the pound at par than in America with the dollar at a premium. The same is true to a lesser degree of Spain, Holland and Switzerland which profited from the war and the value of whose money has not declined to such an extent as that of other countries, although not at pre-war levels as compared with the dollar. They are, however, practically at par in comparison with the pound sterling.

The exchange situation has reacted detrimentally for Americans both as concerns exports and imports, Mr. Pearson pointed out, and the sooner it is stabilized the sooner will American traders be welcomed abroad.

There are many opportunities for the marketing of American goods in Holland, Spain and Switzerland with some in England, but few at present in the other countries of Europe. This is particularly true of Czechoslovakia, France and Italy. Germany is very friendly to the United States for it hopes to rehabilitate itself through trade with this country. Its chief needs now are raw materials and finances. Its factories are busy on such raw materials as are obtainable and these goods are finding a ready market, especially in England.

BOYCE STARTS CANADA PLANT

NEW YORK, Nov. 8—Owing to the increasing demand for its product in the British dominions, the Boyce Moto-Meter Co., Inc., of Long Island City, has established a Canadian factory at Hamilton, Ontario, the largest manufacturing center in the Dominion. Its modern factory building is located on the main line of the Grand Trunk and Canadian Pacific Railroads. The general manager of the plant will be Samuel E. Ryder, who has been with the Detroit branch.

BRITISH BODY MAKER EXPANDS

LONDON, Oct. 28 (*Special Correspondence*)—Davidson (Trafford Park) Ltd., of which Marshall Stevens, M. P., is chairman, is about to start production of four special standardized Ford bodies for sale through the trade, and will quote for designs for other chassis in lots of not less than 500 bodies.

British Car Makers After Foreign Trade

Plan Propaganda Campaign— Will Use Movie Films as Experiment

LONDON, Nov. 6—According to the American Chamber of Commerce in London, British motor manufacturers are about to start new forms of propaganda in order to push forward the sale of British motors in overseas markets. Experiments are to be made with cinematograph films as an initial step.

This announcement was made at a meeting of the Imperial Motor Transport Council, by the Secretary of the Department of Overseas Trade, who states that Britain was very much behind other countries in the utilization of films for trade purposes. It was also pointed out that the present cost of maintaining a large stock of demonstration cars and sending them round the world was much greater than the cost of producing and developing films.

That there is need for propaganda is evident judging from the statistics available as to British imports and exports of cars. Although the general returns of British foreign trade for September show decreased imports, a considerable number of cars and chassis are still being imported.

Imports of commercial motor vehicles which are duty free were very high during September, Germany heading the list with 416 complete vehicles, America second with 185, Italy and France being almost level with 93 and 91 cars respectively. As regards imports of passenger cars on which duty is payable, America heads the list with 968 complete cars, practically two-thirds of the total imports, France coming next with 107 complete cars. The majority of these cars is said to be the lower priced cars, which suggests that there is still a demand for motor cars costing from £250 to £400.

Standard Parts Plan Gets Final Approval

CLEVELAND, Nov. 11—Stockholders of the Standard Parts Co. at a meeting here yesterday ratified the refinancing plan proposed by the stockholders and creditors' committees under which the company will get \$10,000,000 additional capital. Under the plan stockholders will subscribe \$4,000,000 to Class A preferred stock; investment brokers will underwrite \$3,000,000 of preferred stock and the banks will provide \$3,000,000 credit. Stockholders already have subscribed one-third of their shares and predictions were made that the receivership will be lifted by Dec. 1.

Five plants of the company will be sold and a part of the proceeds will be used to retire prior lien preferred stock. These plants are the Cincinnati Axle Co., an axle and a spring plant at Canton, the American Ball Bearing Co., Cleveland, and the vehicle spring and axle plant at Connorsville, Ind.

Makers Confident Low Mark Reached

Distributor Reports Show Upward Trend—Employers and Labor on New Basis.

(Continued from page 988)

Reports from distributors throughout the country, factory executives say, indicate an upward trend with a renewed demand which is expected to become noticeable by Dec. 1 and plans now are in preparation for resumption in many factories on that date.

Aside from a few of the smaller companies which have fallen by the wayside the industry has been able to weather the storm and with the crisis believed passed there is every hope that all will be able to come through. In fact leading men in the industry have turned from the darker side of the picture. Elimination of the hurly burly attitude and the inclination to get down to a sane business basis appears to permeate the industry.

A material cut in wages upon resumption in all plants which have been closed is believed certain with every indication that employees will be willing to get back on the job at reduced wages.

"We are in the happy position now of being able to tell the employee how we want our work done," said an official of Lincoln Motor Co. "There is a marked difference between the attitude of the employee to-day and three months ago. The wage reduction which it would be most natural to expect will not have the effect of antagonizing labor for employees are human and know that stabilization of conditions means reduction all along the line."

Production Cut in Half

Dort was off about 40 per cent and Paterson about 50. E. A. Nelson Motor Car Co. did not resume production Nov. 1 as planned. Lincoln Motor Co. did not get into production until the last few days in the month. Last week Lincoln production was maintained at the rate of 25 a day and this week the schedule will be increased to 35 with an effort to increase the output each week. Handley-Knight at Kalamazoo is just starting production, the first Handley-Knight car in Detroit having been put on display in the salesroom. Jackson Motors Corp. and Briscoe were off about 60 per cent in October. Barley Motor Car Co., which built 125 Roamers in September cut the October schedule to 78. Lorraine Motors Corp., at Grand Rapids, built 15 cars during October and officials reported few encouraging indications for the future.

Production at the new plant of the C. H. Wills Co., at Marysville, will begin Jan. 1. Though no official statement has been made it is believed to be the plan of Wills and his associates to start on a schedule of about 250 a month, increasing the output as demand increases.

In the truck end factory officials gen-

PIERCE-ARROW READY FOR 1921 BUSINESS

BUFFALO, N. Y., Nov. 8—When his attention was called to-day to the drive being made in Wall Street against the stock of the Pierce-Arrow Motor Car Co., the following statement was made to "Automotive Industries" by Col. Charles Clifton, chairman of the board of directors:

"The Pierce-Arrow Motor Car Co. has devoted recent months to preparation for production of new lines of both trucks and passenger cars. During this period shipments have been limited. The company will enter upon 1921 in an unusually strong position to secure a liberal volume of business. No new financing is contemplated."

erally have declined to give out any figures. Federal is keeping up at the rate of about 400 a month and Republic reports a schedule of 100 a month is being maintained. In the majority of plants, however, efforts are being devoted to disposition of trucks on hand and in transit with no effort at production except in cases where demands justify continued manufacture.

Ferry Heads Syndicate Negotiating for King

DETROIT, Nov. 9—Negotiations looking to the sale of the King Motor Car Co. are continuing. Well supported reports declare that D. M. Ferry, seed manufacturer and chief owner of the Crosstown Corp., King distributor in Michigan, will take over the plant. D. D. Calvert, new factory manager, admitted a syndicate of Detroit men headed by Ferry will in all probability become the new owners. Ferry declined to make any statement.

Calvert, former factory superintendent, has succeeded R. G. Hendricks as factory manager under the Detroit Trust Co., receivers. Hendricks and W. R. Wiley, chief engineer, have left the King organization. Neither announced their future plans.

DU PONT REDUCES PRICES

WILMINGTON, DEL., Nov. 9—New factory list prices of du Pont automobiles are announced as follows: Touring car, \$3,400; roadster, \$3,400; suburban sedan, \$4,900; touring sedan, \$4,900. The new prices now are in effect. They represent a decrease of \$600 in the open models and \$700 in the enclosed cars.

TO STOP ALCOGAS PRODUCTION

NEW YORK, Nov. 9—The United States Industrial Alcohol Co. announces that it will discontinue the manufacture of alcogas, its motor fuel. It is said to be impossible to satisfy the demands of the trade for alcohol and produce alcogas at the same time.

Adolf Pricken Held Under \$50,000 Bail

Hamilton Motors Head Charged with Larceny in Warehouse Stock Sales

NEW YORK, Nov. 9—Adolf Pricken, president of the Hamilton Motors Co. of Grand Haven, Mich., and of the Coastwise Warehouses, Inc., in this city, was held in \$50,000 bail to-day on an indictment charging him with grand larceny in the second degree. The real charge against him is that he operated a "get-rich-quick" scheme by the sale of stock in his warehouses. His arrest disclosed that he had served two prison terms but that he began life anew five years ago and in the interim has accumulated a fortune estimated at \$1,000,000.

A dispatch from Grand Haven quotes W. G. Jarman, treasurer and general manager of Hamilton Motors, as asserting that the arrest of Pricken will have no effect on the affairs of the company. Jarman declared Pricken would be ousted from the presidency as soon as action can be taken. He denied that Pricken was the financial backer of the company but asserted that he was elected president last March upon his agreement to take a considerable portion of the stock. This stock agreement never has been fulfilled, Jarman declared.

Hamilton Motors has been operating about three years, making a few Apex trucks each month, but has been down for the last two months and still is out of production.

In connection with his warehouse venture, Pricken organized the Thirty-fourth Street Stores, Inc., Washington Street Stores, Inc., Charlton Street Stores, Inc., and Jayne Street Stores, Inc. As the result of investigations made by the district attorney of Kings county of complaints made by stockholders it has been found, it is alleged, that some of the corporations in which stock was sold were "paper companies" and their securities worthless.

District Attorney Lewis said many persons bought this stock upon the representation that it would return guaranteed dividends of 50 per cent a year. He stated that about \$500,000 worth of stock was sold and that the purchasers were widely scattered, some of them living as far away as Maine.

His attorneys deny he ever promised 50 per cent returns to investors, but did pledge 1 per cent a month, promising to buy stock back at par. It is understood his warehouses have been very profitable.

TO INCREASE CAPITAL STOCK

PHILADELPHIA, Nov. 9—The Interlocking Cord Tire & Belt Co. of Magadore, Pa., will increase its capital to \$5,000,000 following its purchase of the Canton plant of the Republic Rubber Co., the Trumbull Tire & Rubber Co. of Newton Falls and the Ashtabula plant of the Pearce Tire & Rubber Co.

Big Sales Campaign to Start with Shows

N. A. C. C. Directors Decide Concerted Effort Then Will Restore Normal Trade

NEW YORK, Nov. 11—Concerted and united effort on the part of manufacturers to make the national automobile shows this winter the greatest ever held was decided upon yesterday by the directors of the National Automobile Chamber of Commerce at their monthly meeting here.

This effort will be concentrated in an advertising campaign designed to promote sales and to enthuse dealers. Most car makers will use very liberal space in the period around show time. Their appeal will be directed not only to potential purchasers but to their dealers upon whose efforts so much of their own success depends. In the aggregate the campaign probably will be one of the biggest ever conducted by the industry.

Dealers are expected to attend the New York and Chicago shows in droves and the manufacturers will take advantage of every opportunity to infuse into them an enthusiasm and optimism which cannot fail to bring results in actual sales. There is a conviction throughout the manufacturing end of the industry that the volume of sales which will result from the coming shows will be sufficient to send factories ahead at full steam and give the industry such an impetus that the present slump soon will become only a memory.

Almost every manufacturer already is making plans to put pep into his dealers. In most cases this will take the form of dinners at which there will be inspirational speakers.

Pending the completion of details of these campaigns aggressive work is to be started at once. Assistance and encouragement will be given to dealers and they will be vigorously supported in their sales efforts. Several factories have already instituted such work with good results, in both cars and trucks.

Keep Plants Mobilized

Conservative optimism marked the meeting of the directors. They were convinced that by the end of the shows the industry will be well on the way to normal, but they have no illusions as to the problems which still confront them. They expect it will take some time to work out these questions. Most of them are financial in their nature and involve keeping their organizations and plants mobilized for instant action when the right time comes.

A committee representing the Motor and Accessory Manufacturers Association conferred with the directors with the result that there was a further strengthening of the co-operative spirit. It was conceded that each branch of the industry must bear its share of the burdens at this time.

SON OF YAQUI CHIEF IS STUDYING TRACTORS

NEW ORLEANS, Nov. 8—Cajeme Mori, son of the chief of the Yaqui Indians, who recently made a peace treaty with the Mexican authorities after 300 years of intermittent war, is at Louisiana State University and Mississippi Agricultural College, studying modern farming methods for a few weeks, prior to purchasing several tractors to take back to the farm reservation given his people.

Receivers Are Named for Ericsson Company

BUFFALO, N. Y., Nov. 9—William A. McDougall and Robert E. Powers have been appointed receivers of the Ericsson Mfg. Co., manufacturers of magneto and other electrical appliances, with a plant at 1100 Military Head.

The appointment was made by Federal Judge Hazel on the petition of a foreign creditor represented by Attorney Carl H. Smith, who also is secretary of the company. The foreign creditor is Allamanna Telfonaktiebolaget L. M. Ericsson, a Swedish concern.

The proceeding was a petition in equity, the papers plainly stating that the petitioners are of the opinion that the Ericsson company is solvent. It was with this point in view that McDougall and Powers were appointed receivers, it being the plan as at present outlined for the receivers to carry on the business. The receivers are under joint bond of \$50,000.

Smith, while declaring that the financial affairs of the company would be straightened out so that none of the creditors would lose a dollar, says that the general slump in business, coupled with the low exchange rate now in force, is responsible for the action taken. It is the plea of the petitioner that the appointment of receivers is the best thing for the company. There is no allegation of bankruptcy in the petition. According to the petition on file with the clerk of the U. S. District Court, the Ericsson company's indebtedness to A. T. L. M. Ericsson is \$50,000.

The Ericsson Mfg. Co. made the Berling magneto during the war. This magneto went into all government airplanes. The inventor of the Berling magneto is W. C. Berling, vice-president of the company, who resides in Kenmore.

MOTORS PLANT RE-OPENS

DETROIT, MICH., Nov. 9—The Continental Motors Corp. re-opened its plant at Muskegon yesterday after a shutdown of three weeks. Normal production is expected inside of a month. Officials say the re-opening is justified by specifications outlined by automobile manufacturers and the prospect of a resumption of manufacturing in all plants around Dec. 1.

Willys Negotiating \$30,000,000 New Cash

New Funds to be Used for Working Capital and to Finance Inventory

NEW YORK, Nov. 11—Negotiations for the flotation of \$30,000,000 in new securities have been begun with local bankers by the Willys-Overland Co. What form these securities will take has not been determined. It is expected the Chase Securities Corp. and Blair & Co. will be the bankers chiefly concerned in the transaction. The corporation has no funded debt and under the terms of the agreement with preferred stockholders no mortgage can be placed without the consent of three-fourths of the outstanding preferred stock.

The new funds will be used for working capital and to finance inventory. Sale of 600,000 shares of common stock last March netted the company \$12,000,000.

At the offices of John N. Willys all information regarding the transaction was refused. It was admitted, however, that negotiations were pending although they will not be completed for several days.

Chrysler and Willys Sales to Be Separate

NEW YORK, Nov. 11—The Chrysler Motor Co. has been incorporated to take over the distribution and sale of the new Chrysler car. This disposes of the report that it would be handled by the Willys-Overland sales organization. General sales offices have been established at the plant in Elizabeth, N. J. The company contemplates the establishment of distributing points to keep pace with production rather than a general distribution of sample cars.

MORSE OPENS DETROIT BRANCH

DETROIT, Nov. 6—Morse Chain Co., Ithaca, N. Y., manufacturers of rocker joints silent chain, used for power transmission, has established a Detroit branch factory devoted exclusively to the manufacture of silent chain sprockets and the Morse adjustment. The local branch will be under the management of F. C. Thompson, with F. M. Hawley as chief engineer, and C. B. Mitchell, factory manager.

FORD GETS WATER POWER

DETROIT, MICH., Nov. 9—Henry Ford and his son have acquired the Dexter flour mills and Huron river power rights at Dexter, near Ann Arbor, at a price not announced. The deal conveys the power right for a long distance above the Dexter dam, officials say.

VICTOR TIRE REDUCED

SPRINGFIELD, OHIO, Nov. 11—The Victor Rubber Co. announces a reduction of from 12½ to 15 per cent in tire prices, effective immediately.

N. A. C. C. Takes Stand for National Roads

New Platform Would Devote Motor Fees to Maintenance Only—Truck Men Meet

NEW YORK, Nov. 10—A new platform constituting a declaration of its principles on the subject of highways was presented to the Highways Committee of the National Automobile Chamber of Commerce yesterday by Pyke Johnson, secretary of the committee. It will supplant the original platform which was adopted in 1912 and is designed to meet more modern conditions.

The platform asserts the belief of the N. A. C. C. in a national highway system built and maintained by the Government, with inter-county or State systems maintained by the States and district or county systems maintained by the counties.

It declares that motor registration fees should be set aside for maintenance uses instead of construction inasmuch as registration fees are recurrent and maintenance charges constitute a recurrent tax. It also declares for an adequate centralized engineering control with the personnel adequately paid.

Snow removal, the platform asserts, should be an ordinary item of maintenance.

Another plank calls for the systematic and scientific development of highway engineering.

Attention also is called to the importance of promoting the development of improved highways in other countries. In this connection Johnson stated that the Federal Bureau of Roads had under preparation pamphlets telling of the best practices obtaining in this country in road building which will be translated into Spanish and other languages for world-wide distribution. The Bureau of Roads also has in preparation a map of the snow belt in the United States showing the most important highways. Government action in this respect will be purely advisory, however, and the actual work must be done by the States and counties.

Wants More Traffic Engineers

Importance of maintenance is one of the chief points covered in the new platform. It is contended that there should be a traffic engineer in every state highway department in the country.

A constructive program for the guidance of every interest in the country devoted to the development of improved highways will be considered at a meeting to be held in Washington next month under the auspices of the Bureau of Roads.

One of the most important movements ever undertaken for the development of good roads will be set in motion here tomorrow when a highway committee of the engineering division of the National Research Council will be formed. Its purpose will be to refer to colleges and

BAY STATE HONORS AUTOMOBILE MAN

BOSTON, Nov. 6—Congressman Alvan T. Fuller, Eastern New England distributor of the Packard car and one of the pioneers in the automobile business, broke up the line of succession of the speaker of the house acquiring lieutenant-governorship, by putting in for nomination and winning out because it was time for a business man to be in the office instead of a politician.

He was endorsed by the motor car trades of Greater Boston and President Jesse A. Holton of the Bay State Automobile Association, at a meeting held after the election, expressed the pleasure it has given automobilists in general to know that a man so closely associated with motoring had obtained the position.

universities various problems of highway research for analysis and investigation.

The highways committee discussed at considerable length the status of the Townsend bill, which will be called up in committee at the coming session of Congress. Unless action is taken on it at this session it is highly unlikely there will be any Federal legislation before 1923 because the impending extra session will consider only major questions, such as peace and taxation and there will be time to take up highway legislation at the short session which will follow. It is hoped that authorization will be given at the coming session for the appointment of a Federal Highway Commission to lay out a system of roads and then get appropriations to build them at some later date.

The motor truck committee of the N. A. C. C., at a session yesterday, discussed the problems peculiar to that branch of the industry, particularly the problems of the used truck which is interfering seriously with sales of new vehicles. An investigation also was begun to learn the source of propaganda which is being carried on in country newspapers against the motor truck on the ground that it is destroying highways without bearing an adequate tax for their maintenance.

HONORS 50 YEARS OF SERVICE

ALDENE, N. J., Nov. 6—The Watson-Stillman Co. recently presented to Walter Watson a check for \$1,000 upon completion of fifty years of service with the company as a machinist. Walter Watson was a brother of Thomas H. Watson, who was a member of the firm at the time of his death in 1896. The record of the presentation says that the check was given because "his record as a machinist has shown him to be highly skilled, industrious, faithful and loyal." The booklet issued in commemoration of the event names nine twenty-five year men.

Sales Consolidated by Tire Companies

Sterling and Empire Organizations Taken Over by Rubber Corporation

NEW YORK, Nov. 6.—The entire sales and selling organizations of the Sterling Tire Corp. and the Empire Rubber & Tire Co. have been taken over by the Rubber Corp. of America, which has been formed by the two companies in co-operation with New York banking interests. In all other respects the manufacturing companies remain separate and distinct as before, there having been no change in the controlling interests.

The object in forming the new sales company was to increase efficiency and secure economy in branch operation; to maintain larger stocks of goods in centrally located warehouses; to consolidate advertising effort and to relieve the heads of the manufacturing departments of all details of selling and financing sales.

The organization of the Rubber Corporation is as follows:

President and general manager, Francis I. Reynolds, formerly a sales manager for the United States Rubber Co.; vice-president and advertising director, Charles Austin Bates, chairman of the executive committee of the Sterling Tire Corp.; treasurer, William M. Pepper, a banker.

The directors are General C. E. Murray, former president of Empire Rubber & Tire Co., C. E. Murray, Jr., vice-president and treasurer of the Empire company; William T. Baird, president of the Baird Rubber Trading Co., New York, and Joseph A. Miller, director and treasurer of Sterling Tire Corp.

General offices of the Rubber Corp. of America will be at 240 West Fifty-fifth street, New York, with branches in Boston, Philadelphia, Pittsburgh, Buffalo, Chicago, Kansas City, Atlanta and San Francisco. Sterling branches in most cities will become distributors for the Rubber Corporation.

NEW PLANE RECORD SET

NEW YORK, Nov. 8—Advices from Paris state that on Nov. 4 Captain de Romanet, the French aviator, in a Spad-Hispano airplane, flew one kilometer at the speed of 309 kilometers an hour. This broke the world's record of 292.82 kilometers, made by Sadi Leconte, the winner of the recent James Gordon Bennett Cup race.

WATSON TRUCK ORGANIZED

CANASTOTA, N. Y., Nov. 9—The Watson Truck Corp. has been incorporated with an active capital stock of \$2,150,000. The incorporators are A. A. Kessler, H. Casler and J. Souter. The company is a reorganization of the Watson Products Co. which was itself a reorganization of the Watson Wagon Co.

INDUSTRIAL NOTES

White Mfg. Co. has been formed and has purchased the business of the Goshen Motor Works at Goshen, Ind. The new company will return to the production of the Goshen two-cycle marine motors making two single cylinder and two double cylinder models.

Falls Rivet Co., Kent, Ohio, has purchased the cotter pin business of the Ohio Wire Goods Co., of Akron and the machinery used in this department has been removed to the Kent plant. The remainder of the Akron plant remains intact.

Haywood Tire & Equipment Co., Indianapolis, is planning the establishment of branch schools in all parts of the United States, to teach the Haywood system of tire repair to men contemplating entering the business.

Lafayette Tool & Equipment Co., Lafayette, Ind., has appointed Russell, Holbrook & Henderson, Inc., with sales offices in New York and Cleveland, as sole agents in the United States.

Milburn Wagon Co., Toledo, will erect a new plant on the site of its former works, which is designed to give it more than treble the present capacity for electric automobiles.

Carriage Factories, Ltd., has concentrated its carriage business at the Alexandria plant and devoting operations at the Orillia plant more in the direction of motor accessories.

Schwartz Motor Truck Co., Reading, Pa., will build a one-story factory and office building at a cost of \$40,000.

Prest-O-Lite Co. has started work on its \$150,000 plant at Cambridge, Mass.

FIRST YOUNG TRUCKS BUILT

CLEVELAND, Nov. 8—Young motor trucks, built in the plant of the Young Motor Truck Co., this city, made their appearance here last week. Offices of the corporation were moved into the plant last Wednesday, and the company expects to get into full production by Nov. 25.

The company was organized July 28. It already has built and shipped two of an order of twenty-five Young trucks, which are to be used by a company operating a silver mine in the Mexican interior. The Young truck is a duplicate of the Giant truck and is built under license to embody all its features.

MANSFIELD SELLS CAPACITY

AKRON, Nov. 8—The Mansfield Tire & Rubber Co. at Mansfield, Ohio, reports the booking of orders for tires amounting to \$1,000,000. It is also reported by the company that these orders will enable the plant to operate at 100 per cent capacity until the spring months without additional business. The company recently laid off a considerable part of the force, but will now resume day and night shifts in full force.

CUTLER-HAMMER BUYS PLANT

NEW YORK, Nov. 8—The Cutler-Hammer Mfg. Co. of New York and Milwaukee has acquired property at Southern Boulevard and 137th Street as an additional plant for the manufacture of "thermopax" and "pyroplax" molded in-

sulation. The 5-story building on the site has been completely equipped with presses for this work. When working at capacity the plant will have a production equal to the insulation plant at Milwaukee, which has been running night and day for the past two years. The New York factory will take care of the Eastern business. F. J. Boller, formerly of the insulation department, will be in charge.

Dixie Rubber Officers
Must Appear in Suit

MEMPHIS, TENN., Nov. 8—The suit brought by the stockholders of the Dixie Rubber Co. against L. C. Cadenhead, president of the corporation, and four directors, will be heard on its merits in chancery court at a date not yet set. A demurrer filed by the defendants was dismissed by the chancellor with the understanding that they be given a reasonable time to file their answer to the original bill.

In their bill the stockholders ask that Cadenhead be deposed and a receiver appointed on the ground of gross mismanagement. Counsel for Cadenhead argued in his demurrer that the case should be dismissed on ground that they had failed to seek redress from the directors and that they should have gone into court only as a last resort.

The stockholders allege in their suit that Cadenhead also is president of L. C. Cadenhead & Co., brokers, and that he caused an illegal contract to be entered into between the two companies, without the knowledge of the stockholders, whereby the L. C. Cadenhead Co. would be paid a commission of 25 per cent on all stock sold. It is alleged further that Cadenhead and another director bought a large amount of the stock of the rubber company at par and sold it at \$150 a share to applicants who thought they were buying the stock from the company. It also is asserted that Cadenhead and his associates paid themselves 25 per cent commission on these transactions out of the cash assets of the company.

COLUMBIA TIRE SUED

AKRON, Nov. 8—Suits have been filed in Common Pleas court here by the State Savings & Trust Co. against the Columbia Tire & Rubber Co. of Columbiana, Ohio, to recover on two promissory notes. Both notes, according to the papers in the case, were made payable to the Akron Seamless Rubber Tube Co. which is also named as defendant. One note for \$1,468.08 is dated Aug. 15, 1920, and the second for \$2,534.33 is dated Aug. 17, 1920, but maturing at 60 days. The bank alleges payment was refused by the defendants.

REEVES TO ADDRESS A. E. A.

NEW YORK, Nov. 6—Alfred Reeves, general manager of the National Automobile Chamber of Commerce, will address the Automotive Equipment Association at its convention in Chicago Nov. 17 on "Future Prospects in the Automotive Industry."

METAL MARKETS

FROM a broad economic point of view, the downward price adjustment still in progress in the iron and steel markets undoubtedly is preferable to a sudden reduction from the inflated war and boom prices. The immediate effect of this gradual deflation, however, is much on the order of a man trying to pull a tooth without the aid of a dentist. Every jerk at the molar hurts, and there are an infinitely greater number of them than there would be if the operation were performed in a trice with a pair of forceps.

Contrast the situation in the copper market, for instance, with that in pig iron. When the red metal went to around 14½c, it was recognized by the most timid buyers that every bit of the swelling had been removed from the price and, as a result, a modicum of buying got under way, relieving the market of its sickly pallor. Pig iron, on the other hand, is traveling downward so slowly that buyers have little faith that any of these gradual recessions will be the last.

To a certain extent the same feeling prevails with reference to steel prices. The report that Henry Ford contracted for between 15,000 and 20,000 tons of black sheets with a Youngstown district rolling mill at below 5c, failed to engender among automotive purchasing agents a feeling that the time for anticipating their wants had arrived. Moreover, continuing discussion in certain quarters of the sheet industry of the "sanctity" of their contracts or rather their contract prices, is not designed to whet the zest for commitments on the part of the automotive industry until the specter of blank order books compels a more reasonable attitude among those sheet makers who, rather than face the situation with a broad smile, as other branches of the steel industry have done, try to surround themselves with a false halo of martyrdom.

Pig Iron—The market is strictly a resale affair. The outlook for 1921 is uncertain with \$40 predicted by pig iron sellers of the conservative type and \$35 by equally conservative consumers. Henry Ford is reported to have ordered intensive operation of his Imperial mine at Michigamme, Mich., where the state tax commission estimates 1,000,000 tons of developed ore. This move is interesting to the trade because it denotes the generally growing desire on the part of large consuming interests to make themselves independent of a recurrence of such vagaries as abounded in the pig iron market in 1920.

Steel—Pittsburgh advises state that the automotive industry has cancelled virtually all strip steel contracts it had on makers' books. Small cold rolled strip tonnages are moving at 5c and of hot-rolled at 8c. The market, as a whole, is in abeyance.

Aluminum—Quiet prevails with values strictly nominal. Report has it that the Anaconda Copper Mining Co. is assiduously seeking a source of bauxite in the State of Washington which is interpreted as portending that powerful interest's entry into the aluminum business.

Lead—The American Smelting & Refining Co. late on Monday announced a reduction in its price of lead amounting to \$5 a ton and making the company's official quotation 7c, both New York and East St. Louis.

Brass—Cancellations from the automotive industry are reported to have come to a halt. One independent mill has reduced some of its prices further, bringing copper sheets down to 24½c. Deliveries of brass are now obtainable in from two to three weeks.

FINANCIAL NOTES

International Motor Truck Corp. reports net profits after charges and Federal taxes for the nine months ended Sept. 30 of \$3,114,331, equivalent after preferred dividends to \$7.99 a share earned on the \$83,108 shares of outstanding common stock of no par value. For the quarter ended Sept. 30 the net profits were \$950,910, an increase of \$239,346 over the same quarter last year. For the nine months the increase over last year is \$1,216,894.

Black & Decker Mfg. Co.—Report as of Oct. 31 shows net sales for first ten months of the year are 63 per cent in excess of the total sales for 1919. The company's business has grown very rapidly in the last two years and while keeping up its production a modern residential community has been developed for employees. The chief product of the company is portable electric drills.

Chevrolet Motor Corp. of California.—Company has been authorized to issue its entire capital stock of \$100,000 to the General Motors Corp. of Delaware, the latter to pay the California corporation \$100,000 in cash and other property. The California Chevrolet hitherto has been a separate company owned by W. C. Durant and Norman Devaux.

Hood Rubber Co. stockholders have voted to change common stock from \$100 par to shares of no par. There is \$5,000,000 common now outstanding. It is understood to be the intention of the company to declare a 100 per cent stock dividend. Last spring it paid a 66 2/3 per cent common stock dividend.

American Bosch Magneto Co. reports it has cut overhead 17 per cent in a month to conform to the temporary condition of lower output. Sales on the Gray & Davis output are running at the annual rate of \$2,500,000 to \$3,000,000, which would mean between \$2.50 and \$3 a share for Bosch stockholders.

Templar Motors Co. has arranged with the Guardian Savings & Trust Co., Cleveland, for a \$1,000,000 issue of first mortgage 8 per cent ten year bonds, dated Oct. 1, 1920. The bonds are not to be sold, but will be held and used as collateral, if need be.

Continental Motors Corp. has decided to advance its dividend payments one month. The question of disbursing a dividend on Dec. 15 will come up for consideration by the board at the next regular meeting, Nov. 30.

Mullins Body Corp. for the nine months ended Sept. 30, reports net profits after Federal taxes of \$652,975, equivalent after preferred dividends to \$5.93 a share on the 100,000 shares of stock (no par).

Curtiss Aeroplane & Motor Corp. has reduced its capital from \$6,000,000 to \$5,436,100 (par \$100). Common stock authorized remains at 303,000 shares (no par). Stated capital, \$6,978,100.

Vulcanizing Machine & Supply Co., Jackson, Mich., has been incorporated for \$25,000 by Mark Merriman, James N. House and Herbert S. Reynolds.

INDIA TIRE SUES TEXAS

AKRON, Oct. 30—Suit has been filed in the Court of Common Pleas of Akron by the India Tire & Rubber Co. of this city against the Texas Motor Car Association, Fort Worth, Texas, to recover \$20,000 on a note given Aug. 24, according to the petition, due to mature in 60 days with interest at the rate of 7 per cent. The note, according to the papers,

is signed by W. H. Vernor, president of the Texas concern. J. M. Alderfar, president of the India, in his affidavit of attachment, declares that the defendant has conveyed and otherwise disposed of its property "to cheat and defraud its creditors and hinder and delay them in the collection of their debts."

Maibohm Motors Shows
Surplus of \$127,821

SANDUSKY, OHIO, Nov. 8—The balance sheet of the Maibohm Motors Co. as of Sept. 30 shows as follows:

Assets: Lands, buildings and machinery and equipment, etc., \$472,180; investments in miscellaneous stocks and bonds, \$11,259; cash, \$44,551; sight drafts and accounts receivable, \$298,367; merchandise inventory, \$759,458; prepaid expense, \$29,861; trade marks and good will, \$1; total, \$1,615,681.

Liabilities: Capital stock outstanding, \$1,034,550; accounts payable, \$246,242; notes and acceptances payable, \$96,305; dealers' deposits, \$32,098; accrued taxes and insurance, \$7,306; reserve for estimated federal taxes, \$41,356; other reserves, \$30,000; surplus, \$127,821; total, \$1,615,681.

In a letter to the stockholders President Maibohm states that the earnings have been very satisfactory, although the dividend for the third quarter was passed because of the general financial stringency and unsettled business conditions.

Hupp Shows Surplus
Near Five Million

NEW YORK, Nov. 8—The consolidated balance sheet of the Hupp Motor Car Co. as of Sept. 30 last shows the following:

Assets—Land, buildings, machinery, equipment, etc., \$3,223,625; Peter Smith property, not used in operations, \$550,000; cash, \$497,074; accounts receivable, \$1,764,638; inventories, \$4,745,634; Government securities, \$1,407,130; other securities, \$926,296; accrued interest, \$19,263; deferred charges, \$87,337; good will, trade names, etc., \$3,858,921; total, \$17,079,921.

Liabilities—Preferred stock, \$864,100; common stock, \$5,192,100; purchase money obligations, \$960,000; accounts payable, \$2,604,202; reserve for Federal taxes, etc., \$1,962,933; other reserves, \$795,626; surplus, \$4,700,956; total, \$17,097,917.

ALLEN GETS NEEDED FUNDS

COLUMBUS, Nov. 9—Stockholders and bank creditors of the Allen Motor Car Co. have subscribed the entire \$500,000 with which it is proposed to rehabilitate the company. Holders of 95 per cent of the claims against the company have deposited them with the creditors' committee but it is hoped to make the deposits represent all the creditors. When this is brought about steps will be taken to lift the receivership.

Bank Credits

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

NEW YORK, Nov. 11—The rising tide of commercial failures registers more promptly the slowing down of business with declining commodity prices. Reported defaults in October numbered 923, involving liabilities of \$38,914,659. In numbers the failures were the greatest since March, 1918, and in liabilities the greatest since April, 1915. Compared with failures in September, the increase in numbers was 246, in liabilities \$9,360,371.

Banking clearings for 178 cities in October totaled \$38,769,000,000, compared with \$35,991,000,000 in September and \$41,830,000,000 in October, 1919. The full effect of decreased business activity in recent weeks is not shown in the clearings figures, inasmuch as settlements for mercantile operations, as a rule, are not made until some time after the exchange of goods takes place.

The ruling call money rate in the local market continues at 9 per cent, the range last week averaging slightly higher than in the previous week. Nominal time money rates generally remain unchanged, with continued concentration of the small volume of business on short maturities.

The New York Federal Reserve Bank's statement last week showed no marked change in the bank's reserve position, perhaps the most significant change for the week being the increase of outstanding Federal Reserve notes to a new high level at \$886,708,000.

The weekly statement of the Clearing House Association, however, revealed some marked changes in actual condition, giving further evidence of the transfer of funds from this center to the interior. Loans declined \$54,255,000, and net demand deposits \$78,323,000. The item bills payable, rediscounts, etc., increased \$9,148,000 to a new record amount, \$1,315,971,000. Reserves, declining by \$15,301,880, fell below legal requirements for the third time since September, in this case, however, by only \$1,306,790.

The Federal Reserve Banks lost slightly in gold holdings last week, but gained more in other cash, total reserves increasing \$1,691,000.

SUPERIOR IN RECEIVERSHIP

NEWARK, N. J., Nov. 8—Robert H. McAdams of Elizabeth has been appointed receiver for the Superior Body Co., Inc., of Rahway, upon petition of Joseph Oxman and Thomas Armstrong, holders of 27,500 shares of its stock. The receiver has been authorized to continue the business. The company claims to have orders for 1000 automobile bodies at \$1,065 each and an order for another 100 in sight. The petition says, however, that it has not the means to meet current liabilities. The present debts are listed at \$76,000 and the assets at \$239,000.

Men of the Industry

A. G. Schonmaker has become treasurer and general manager of the Eastern Motor Sales Co., Detroit, distributor of Service trucks. He was sales manager of the Gray-Dort Co. at Chatham, Ont., and also the Canadian Chalmers factory in Windsor. He was one of the organizers of the Marvel Carburetor Co. of Flint. His last connection was with the Bakewell Motor Car Co.

B. S. Short, branch manager of the Standard Parts Co., Boston branch, has resigned his position to join the C. G. Spring Co. at Kalamazoo, Mich. Short became associated with Christian Girl in 1915 as assistant to the branch manager at Cleveland. When he received his discharge from the Army, he accepted the position as Boston branch manager of the Standard Parts Co.

T. W. Tinkham has been appointed assistant general superintendent of the Briscoe Motor Corp. Before joining Briscoe he was general superintendent of the Willys-Overland plants at Toledo. Prior to this Tinkham was associated with Olds Motor Works as general master mechanic and with Packard Motor Car Co. as assistant production manager.

Cecil B. Warner, of the Nelson Motor Truck Co., of Saginaw, Mich., has assumed the duties of general sales manager in addition to those of chief engineer, and succeeds Glenn B. Hiller. Warner designed the present line of Jumbo trucks. Allan Campbell, formerly of the Power Farming Press of St. Joseph, Mich., has been appointed assistant sales manager.

P. L. Emerson, widely known in the automobile industry, has joined the Reo Motor Car Co. sales organization. Emerson formerly was sales manager of the Olds Motor Works and resigned that position several months ago to assume the vice-presidency of the Jackson Motor Corp. He left the service of the Jackson company about a month ago.

Otto E. Utz, who for many years has been the general purchasing agent of the Pierce Arrow Motor Car Co. and up until recently, under the new management of that company, was assistant manager of purchases, has associated himself with the Nichols & Wright Motor Co. of Buffalo as vice-president and general manager.

R. W. A. Brewer, who during the war was inspector of motor apparatus for the British government and who since has been connected with the R. W. Brewer Patents Co., sails for Europe, Nov. 20, to look after European patents and expects to return to America in the course of a few months.

H. E. Westerdale, of the Westerdale Motor Sales Co., Cleveland, has taken over distribution rights in Michigan for the Gardner car, manufactured in St. Louis. Westerdale is a former Detroit automobile man and at one time was connected with Studebaker and later with the Hupp organization.

Alan R. Fernald has been appointed advertising manager of the Chrysler motor division of the Willys Corp. with headquarters at the general offices in Elizabeth, N. J. He was formerly in the advertising and sales departments of the Willys-Overland organization at Toledo.

A. D. Moore, formerly manager in Kansas City and Chicago for the branches of the Ohio Electric Car Co. and later general sales manager at the Toledo factory, has moved to Detroit to take over distribution of the Millburn Electric in the Detroit territory.

W. T. Bush has resigned as manager of the Packard Detroit branch and is succeeded by H. W. Peters, former assistant to President MacAuley as factory and later office manager. Bush announced no plans.

Reuben Kuempel has been added to the staff of engineers of the tractor bearings division of the Hyatt Roller Bearing Co., Chicago. He has been identified with the automotive industry since 1913.

C. F. Clow, Sewell Cushion Wheel Co., branch manager at Cincinnati, has been appointed assistant sales manager. C. W. Frick, formerly of the Dayton, Ohio, branch succeeds Clow at Cincinnati.

W. O. Browne has been appointed general sales manager of the Southern Motor Mfg. Ass'n. He was formerly district manager and special representative of the Bethlehem Motors Corp., Allentown, Pa.

A. G. Many has been appointed director of distribution of the Franklin Automobile Co. He was formerly assistant to the president in connection with the merchandising end of the business.

H. A. Conlon, former vice-president of the Acason Motor Truck Co., has joined the Paige Detroit Motor Car Co. as truck sales manager, to succeed C. S. Pike.

Earle E. Devlin has been appointed office sales manager of Hare's Motors, Inc., and will be in charge of all sales and specifications at headquarters.

R. T. Walsh, advertising manager of King Motor Car Co., has resigned to become advertising manager of the Apex Truck Co., Ypsilanti, Mich.

William H. Schaefer has become a member of the sales department of the Tuthill Spring Co. Schaefer will call upon the jobbing trade.

Frank Johnson, chief engineer of the Lincoln Motor Co., has resigned to rejoin the engineering department of Cadillac.

C. C. Secrist has been appointed sales manager of the Victor Mfg. & Gasket Co., Chicago.

Moore Stockholders Ask Return of Funds

DANVILLE, ILL., Nov. 8—James H. Vickers, an officer of the Moore Motor Vehicle Co. of this city, has given bond in the sum of \$5,000, following his indictment by a Federal grand jury upon the charge of using the mails to defraud. A number of other officers of the company, also indicted, have filed their bonds. C. B. Thomas, receiver for the company, has asked the court for an order to sell all the real estate, machinery and other personal property at auction, the proceeds to be divided among the stockholders.

Unless the sale brings a larger sum than is now estimated, the assets will barely pay the indebtedness and the receivership fees and expenses, leaving the stockholders little or nothing.

There is a lien of \$50,000 against the plant of the Moore company here in favor of the American Building Association, and this has first claim. Letters have been coming in from many

states of the Union, written by stockholders who are anxious to realize something out of their investment. Those who have made an investigation of the assets fear that there will be general disappointment for all who invested in the concern.

The trial of the officers has been set for the December term of the Federal court. The postoffice authorities have been compiling evidence to be used in the prosecution.

Atlanta Reserve Bank Sets 7 Per Cent Rate

ATLANTA, Nov. 8—The Federal Reserve Bank of Atlanta has announced suspension of its basic line and progressive rate for borrowing and has submitted in place a flat rate of 7 per cent. The change is now in effect.

That this revision of rates will serve to extend credits is the opinion expressed by bankers and financiers here familiar with such matters. They say that the basic lines of the individual banks marked the dividing point between sums they could borrow at 6 per cent and the sums on which progressive rates were charged. The basic lines were determined for each bank upon a basis of its average reserve balance and its investment in Federal Reserve Bank stock.

The opinion is expressed by officials of the Federal Reserve Bank that the removal of this basis line and the substitution of a flat 7 per cent rate would be welcomed by the member banks, notwithstanding that it would raise the rate on small loans. On the other hand it will greatly loosen lines of credit and lower the rate on heavy loans.

There are 450 member banks in the Sixth district which is affected by the change in policy. It does not extend beyond this district.

PETROLEUM INSTITUTE TO MEET

NEW YORK, Nov. 8—Vital problems of the oil industry will be discussed at the annual meeting of the American Petroleum Institute at Washington, Nov. 17, 18 and 19. The sessions will be held at the New Willard Hotel. The great question of supplying the country with oil and gasoline will be discussed not only from the technical and engineering viewpoints but from the business angle as well. One group meeting will be devoted to a consideration of means for promoting economy in the consumption of gasoline in automobiles.

TO KEEP DETROIT ROADS OPEN

DETROIT, Nov. 8—Roads adjacent to Detroit will be kept clear of snow this winter, permitting all season automobile and truck traffic, according to F. F. Rogers, state highway commissioner. Especial attention will be given the roads leading from Detroit to Toledo, Flint and Mt. Clemens. The State will pay 60 per cent of the cost and the counties the remainder. Commissioner Rogers said today full co-operation of the counties interested had been promised.

Calendar

SHOWS

Nov. 14-21—New York, Automobile Salon, Commodore Hotel Ballroom.

Nov. 15-20—Chicago, Automotive Equipment Show, Coliseum, Automotive Equipment Association.

Dec. 10-18—New York, Motor Boat Show, Grand Central Palace.

Jan. 3-8—New York, Motor Truck Show, Motor Truck Ass'n of America, Twelfth Regiment Armory.

Jan. 8-15—New York, National Passenger Car Show, Grand Central Palace, Auspices of N.A.C.C.

Jan. 17-23—Milwaukee, Annual Automobile Show, Milwaukee Automotive Dealers' Ass'n.

Jan. 22-27—San Francisco, Second Annual Pacific Coast Automotive Equipment Show.

ment Exposition, Auditorium.

Jan. 22-29—Cleveland, Annual Passenger Car Show, Cleveland Mfr's & Dealers' Ass'n, Wigmore Coliseum.

Jan. 22-29—Montreal, Annual Automobile Show, Montreal Automobile Trade Ass'n, Motordrome Bldg.

Jan. 29-Feb. 4—Chicago, National Passenger Car Show, Coliseum, Auspices of N.A.C.C.

Feb. 5-12—Minneapolis, Annual Automobile Show, Minneapolis Automobile Trade Ass'n.

Feb. 6-12—Columbus, National Tractor Show, Columbus Tractor & Implement Club, Ohio State Fair Grounds.

Feb. 12-19—Kansas City, Annual Automobile Show, Kansas City Motor Car Dealers' Ass'n.

Mar. 2-11—Des Moines, Annual Automobile Show, Coliseum, C. G. Van Vliet, Mgr.

Mar. 12-19—Boston, Annual Automobile Show, Mechanics Bldg. and South Armory.

FOREIGN SHOWS

Nov. 29-Dec. 4—London, Cycle and Motorcycle Show, Cycle and Motorcycle Mfr's and Traders Union, Ltd., Olympia.

Jan. 7—Sydney, Australian Motor Show.

Jan. 22-29—Colombo, Ceylon Motor Show.

Feb. 7—Delhi, India, Delhi Motor Show.

CONVENTIONS

Nov. 30-Dec. 3—St. Louis, Third Annual Meeting and Exhibition, Automobile Accessories Branch, National Hardware Ass'n.

Dec. 7-10—New York, Annual meeting American Society of Mechanical Engineers, Engineering Societies Building.

Dec. 8-9—Cincinnati, Annual Convention, Ohio Automobile Jobbers' Association.

Dec. 13—Washington, Convention of American Association of State Highway Officials.

Dec. 28-30—Chicago, Annual Meeting American Society of Agricultural Engineers.

Jan. 11-13—S. A. E. Annual Meeting, New York City.

Feb. 2-4—Chicago, First Annual Meeting, Automotive Electric Service Assn. Hotel La Salle.

RACES AND TOURS

Nov. 25—Los Angeles, Thanksgiving Day Speedway Classic, Beverly Hills Speedway.

Mechanical Engineers Form New Sections

NEW YORK, Nov. 5—Four hundred members of the American Society of Mechanical Engineers have organized a professional section on materials handling and will provide primarily a common channel of intercourse between all the technical and industrial organizations co-operating in the solution of engineering problems connected with the handling and distribution of materials and products.

This section will aim to be a bureau of information—complete in its scope, specific in its knowledge of the physical and economic conditions, and unbiased in its conclusions. This will be done by having special meetings on particular subjects, meetings jointly with other sections, other organizations or associations, by taking part in all local and national problems relating to the purpose of this section.

Members of the society interested in aeronautics have organized a professional section on this subject. Howard E. Coffin, Jesse G. Vincent, Orville Wright, C. F. Kettering, Elmer A. Sperry, James Hartness, John R. Cautley, Lionel S. Marks, Miller R. Hutchison, Charles E. Lucke and Joseph A. Steinmetz, all prominent in the aeronautic field in the war, are among those who have registered in the section.

Transportation will be the keynote of the annual meeting of the American Society of Mechanical Engineers which will be held in this city Dec. 7 to 10. The subject will be discussed by experts in all lines of transportation, including railways, waterways, motor trucks, feeders.

TRUCK SALES HEADS TO MEET

DETROIT, Nov. 6—The National Association of Motor Truck Sales Managers will hold its annual meeting at the Hotel Statler, Detroit, Nov. 18 and 19. The business meeting will be held on Thursday, Nov. 18, in the morning and an open

meeting starting at 2 p. m. will be devoted to the following three topics:

1—Good business principles as applied to motor truck industry.

2—Railroads as a market for motor trucks.

3—Work of the National Automobile Dealers Association.

At 7 p. m. the annual dinner will be held. On Friday, Nov. 19, at 10 a. m., there will be a discussion of potential markets and at 2 p. m. on salesmanship.

Extend Work Period in Automotive Course

CLEVELAND, Nov. 5—Acting on information obtained by the Automotive Association of the Chamber of Commerce, the Michigan State Automobile School of Detroit has announced that its previous course of six weeks' theoretical instruction and six weeks' practical instruction has been changed to three weeks' theoretical instruction and nine weeks' practical instruction.

Each day of the theoretical instruction period will be divided so that every alternate two hours will be in the shop. The practical instruction will cover the balance of the course of nine weeks and each day will be nine hours in length, to accustom students to shop hours.

"It is the belief of the automotive association that more practical instruction should be given in automotive schools throughout the country, largely interspersed with theoretical instruction," says Secretary Brown of the automotive association. "The Michigan school is the first to adopt our views."

THORSBY UNDER CHARGES

NEW HAVEN, CONN., Nov. 8—E. Raymond Thorsby, former secretary and works manager of the Kelley Tire & Rubber Co., Inc., of this city, has been held under \$2,500 bond on the charge of stealing \$6,000 worth of cord fabric from the company's plant. He recently brought suit against the company for \$50,000 damages for breach of contract.

Motor Boat Meeting of S. A. E. in December

NEW YORK, Nov. 8—The annual motor boat meeting of the Society of Automotive Engineers will be held Tuesday evening, Dec. 14, at the Automobile Club of America in this city, during the week of the national motor boat show. The technical session will be preceded by an informal dinner at which C. A. Criqui will act as toastmaster. The dinner speakers will be prominent members of the motor boat industry.

The technical session will be devoted to the discussion of recent design advances in internal-combustion motor boat engines and the probable trend of their further development. Both the Otto and the Diesel cycles will be treated from the standpoint of economy, weight, accessibility and durability.

The Metropolitan and Pennsylvania sections of the society plan to join in this meeting, which will replace their monthly meeting for December. A trip of inspection through the plant of one of the representative boat and engine manufacturers near New York City has been planned for the afternoon.

FIAT WINS ECONOMY TEST

NEW YORK, Nov. 5—In the recent fuel consumption trials held at Basle, Switzerland, one of the new Fiat models carried four passengers 97 miles at the rate of 8.85 litres per hundred kilometers, according to reports reaching here. The competitors, about 40 in number, with cars of French, Swiss, Italian, American and English construction were divided into teams and the awards were based on the lowest consumption of the team. The best team average was 6.35 litres per ton and for 100 kilometers, and the most economical car in this team was a four-cylinder Fiat of 65 x 110 m.m. bore and stroke. One of the features of the competition was a wide difference in the amount of fuel consumed by cars of approximately the same size.